



HIGH ENVIRONMENTAL RESISTANCE

# TURQUOISE SWITCHES J TYPE (ABJ)



Dust protected type



(Mounting hole 2.3mm .091inch type)



Immersion protected type (wire leads bottom type)



(Mounting hole 2.3mm .091inch type)



Immersion protected (wire leads side type)



Long stroke type

## FEATURES

- Ultra-miniature size (12.8×6.5×6 mm) (.504×.256×.236 inch)
- Sealed construction for use in adverse environment-Sealed construction by epoxy resin and rubber cap keeps off the cause of miscontact such as dust. Conforming to IP67\* of IEC protective construction classification
- Elastomer double molding technology, an industry first and ultrasonic swaging technology contribute to uniform sealing in high production quantities
- UL/CSA approved
- Long stroke type is available
- Since the repeatability is excellent and the play distance (overtravel) from the operating position is ample, the task of performing the adjustments during installation is an easy one.
- Operating position accuracy  $\pm 0.4 \text{ mm} \pm 0.016 \text{ inch}$
- Overtravel= Min. 2.0 mm .079 inch
- As wide range of high pressure is achieved, a stable reliability is ensured

## TYPICAL APPLICATIONS

- Industrial use video jack
- Automotives (ex. Device for opening and shutting of automobile doors)

\*Based on the protective construction classification of IEC, items which satisfy the test requirements are denoted with an IP designation.

## ORDERING INFORMATION

Ex. ABJ 1 4 1 0 4 0

Type of switch	Size of mounting hole	Terminal	Contact arrangement	Actuator	Operating force by pin plunger (max.)	Contact
ABJ: Turquoise switch J type	1: 1.2 mm (.047 inch) 2: 2.3 mm (.091 inch) 3: 3 mm (.118 inch) 4: Fixed pin (right side pin) type 5: Fixed pin (left side pin) type	4: Solder terminal 5: PC board terminal 6: Wire leads (bottom type) 7: Wire leads (right side type) 8: Wire leads (left side type)	1: SPDT 2: SPST-NC 3: SPST-NO	0: Pin plunger 2: Hinge lever 4: Simulated roller lever 6: Roller lever 8: Leaf lever L: Long stroke type	4: 1.23 N {125 gf} 6: 1.96 N {200 gf} 7: 2.45 N {250 gf} (Long stroke type only)	0: Silver-alloy 1: Gold-clad

- Remarks: 1. Standard packing: Dust protected type 100 pcs./carton, 2,000 pcs./case; Immersion protected type 50 pcs./case.  
 2. SPST-NC and SPST-NO are only available for wire leads type.  
 3. Leaf lever is only available for wire leads type  
 4. Not every combination is available. Please refer to the following table. "PRODUCT TYPES".

# ABJ1,2,3,4,5

## PRODUCT TYPES

### 1. Dust protected type (Terminal type)

Mounting hole 1.2mm .047inch type / Mounting hole 2.3mm .091inch type

Silver alloy

Actuator	Operating force Max.	Mounting hole 1.2 mm .047 inch type		Mounting hole 2.3 mm .091 inch type
		Solder terminal	PC board terminal	Solder terminal
Pin plunger	1.23 N {125 gf}	ABJ141040	ABJ151040	ABJ241040
	1.96 N {200 gf}	ABJ141060	ABJ151060	ABJ241060
Hinge lever	0.39 N {40 gf}	ABJ141240	ABJ151240	ABJ241240
	0.64 N {65 gf}	ABJ141260	ABJ151260	ABJ241260
Simulated roller lever	0.39 N {40 gf}	ABJ141440	ABJ151440	ABJ241440
	0.64 N {65 gf}	ABJ141460	ABJ151460	ABJ241460
Roller lever	0.39 N {40 gf}	ABJ141640	ABJ151640	ABJ241640
	0.64 N {65 gf}	ABJ141660	ABJ151660	ABJ241660

Gold-clad

Actuator	Operating force Max.	Mounting hole 1.2 mm .047 inch type		Mounting hole 2.3 mm .091 inch type
		Solder terminal	PC board terminal	Solder terminal
Pin plunger	1.23 N {125 gf}	ABJ141041	ABJ151041	ABJ241041
	1.96 N {200 gf}	ABJ141061	ABJ151061	ABJ241061
Hinge lever	0.39 N {40 gf}	ABJ141241	ABJ151241	ABJ241241
	0.64 N {65 gf}	ABJ141261	ABJ151261	ABJ241261
Simulated roller lever	0.39 N {40 gf}	ABJ141441	ABJ151441	ABJ241441
	0.64 N {65 gf}	ABJ141461	ABJ151461	ABJ241461
Roller lever	0.39 N {40 gf}	ABJ141641	ABJ151641	ABJ241641
	0.64 N {65 gf}	ABJ141661	ABJ151661	ABJ241661

### 2-(1). Immersion protected type (Bottom wire leads type)

Mounting hole 1.2mm .047inch type

Silver alloy

Actuator	Operating force Max.	Mounting hole 1.2 mm .047 inch type		
		SPDT	SPST-NC	SPST-NO
Pin plunger	1.23 N {125 gf}	ABJ161040	ABJ162040	ABJ163040
	1.96 N {200 gf}	ABJ161060	ABJ162060	ABJ163060
Hinge lever	0.39 N {40 gf}	ABJ161240	ABJ162240	ABJ163240
	0.64 N {65 gf}	ABJ161260	ABJ162260	ABJ163260
Simulated roller lever	0.39 N {40 gf}	ABJ161440	ABJ162440	ABJ163440
	0.64 N {65 gf}	ABJ161460	ABJ162460	ABJ163460
Roller lever	0.39 N {40 gf}	ABJ161640	ABJ162640	ABJ163640
	0.64 N {65 gf}	ABJ161660	ABJ162660	ABJ163660

Mounting hole 2.3mm .091inch type

Gold-clad

Actuator	Operating force Max.	Mounting hole 1.2 mm .047 inch type		
		SPDT	SPST-NC	SPST-NO
Pin plunger	1.23 N {125 gf}	ABJ161041	ABJ162041	ABJ163041
	1.96 N {200 gf}	ABJ161061	ABJ162061	ABJ163061
Hinge lever	0.39 N {40 gf}	ABJ161241	ABJ162241	ABJ163241
	0.64 N {65 gf}	ABJ161261	ABJ162261	ABJ163261
Simulated roller lever	0.39 N {40 gf}	ABJ161441	ABJ162441	ABJ163441
	0.64 N {65 gf}	ABJ161461	ABJ162461	ABJ163461
Roller lever	0.39 N {40 gf}	ABJ161641	ABJ162641	ABJ163641
	0.64 N {65 gf}	ABJ161661	ABJ162661	ABJ163661

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.

Mounting hole 2.3mm .091inch type  
Silver alloy

Actuator	Operating force Max.	Mounting hole 2.3 mm .091 inch type		
		SPDT	SPST-NC	SPST-NO
Pin plunger	1.23 N {125 gf}	ABJ261040	ABJ262040	ABJ263040
	1.96 N {200 gf}	ABJ261060	ABJ262060	ABJ263060
Hinge lever	0.39 N {40 gf}	ABJ261240	ABJ262240	ABJ263240
	0.64 N {65 gf}	ABJ261260	ABJ262260	ABJ263260
Simulated roller lever	0.39 N {40 gf}	ABJ261440	ABJ262440	ABJ263440
	0.64 N {65 gf}	ABJ261460	ABJ262460	ABJ263460
Roller lever	0.39 N {40 gf}	ABJ261640	ABJ262640	ABJ263640
	0.64 N {65 gf}	ABJ261660	ABJ262660	ABJ263660

Gold-clad

Actuator	Operating force Max.	Mounting hole 2.3 mm .091 inch type		
		SPDT	SPST-NC	SPST-NO
Pin plunger	1.23 N {125 gf}	ABJ261041	ABJ262041	ABJ263041
	1.96 N {200 gf}	ABJ261061	ABJ262061	ABJ263061
Hinge lever	0.39 N {40 gf}	ABJ261241	ABJ262241	ABJ263241
	0.64 N {65 gf}	ABJ261261	ABJ262261	ABJ263261
Simulated roller lever	0.39 N {40 gf}	ABJ261441	ABJ262241	ABJ263441
	0.64 N {65 gf}	ABJ261461	ABJ262461	ABJ263461
Roller lever	0.39 N {40 gf}	ABJ261641	ABJ262641	ABJ263641
	0.64 N {65 gf}	ABJ261661	ABJ262661	ABJ263661

Mounting hole 3mm .118inch type (Leaf lever type)  
Silver alloy

Actuator	Operating force Max.	Mounting hole 3 mm type		
		SPDT	SPST-NC	SPST-NO
Leaf lever	0.98 N {100 gf}	ABJ361840	ABJ362840	ABJ363840
	1.27 N {130 gf}	ABJ361860	ABJ362860	ABJ363860

Gold-clad

Actuator	Operating force Max.	Mounting hole 3 mm type		
		SPDT	SPST-NC	SPST-NO
Leaf lever	0.98 N {100 gf}	ABJ361841	ABJ362841	ABJ363841
	1.27 N {130 gf}	ABJ361861	ABJ362861	ABJ363861

**2-(2). Immersion protected type (Side wire leads type)**

Fixed pin (right side pin) type  
Silver alloy

Actuator	Operating force Max.	Wire leads direction	Wire leads type	
			SPST-NC	SPST-NO
Leaf lever	1.27 N {130 gf}	Right	ABJ472840	ABJ473840
	1.27 N {130 gf}	Left	ABJ482840	—
	1.76 N {180 gf}	Right	ABJ472860	ABJ473860
	1.76 N {180 gf}	Left	ABJ482860	—

Gold-clad

Actuator	Operating force Max.	Wire leads direction	Wire leads type	
			SPST-NC	SPST-NO
Leaf lever	1.27 N {130 gf}	Right	ABJ472841	ABJ473841
	1.27 N {130 gf}	Left	ABJ482841	—
	1.76 N {180 gf}	Right	ABJ472861	ABJ473861
	1.76 N {180 gf}	Left	ABJ482861	—

Fixed pin (left side pin) type  
Silver alloy

Actuator	Operating force Max.	Wire leads direction	Wire leads type	
			SPST-NC	SPST-NO
Leaf lever	1.27 N {130 gf}	Right	ABJ572840	ABJ573840
	1.27 N {130 gf}	Left	ABJ582840	—
	1.76 N {180 gf}	Right	ABJ572860	ABJ573860
	1.76 N {180 gf}	Left	ABJ582860	—

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.

# ABJ1,2,3,4,5

Gold-clad

Actuator	Operating force Max.	Wire leads direction	Wire leads type	
			SPST-NC	SPST-NO
Leaf lever	1.27 N {130 gf}	Right	ABJ572841	ABJ573841
	1.27 N {130 gf}	Left	ABJ582841	—
	1.76 N {180 gf}	Right	ABJ572861	ABJ573861
	1.76 N {180 gf}	Left	ABJ582861	—

Mounting hole 3mm .118inch type

Silver alloy

Actuator	Operating force Max.	Wire leads direction	Wire leads type	
			SPST-NC	SPST-NO
Leaf lever	1.27 N {130 gf}	Left	ABJ382840	—
	1.76 N {180 gf}		ABJ382860	—

Gold-clad

Actuator	Operating force Max.	Wire leads direction	Wire leads type	
			SPST-NC	SPST-NO
Leaf lever	1.27 N {130 gf}	Left	ABJ382841	—
	1.76 N {180 gf}		ABJ382861	—

### 3. Immersion protected type (Bottom wire leads type) Long stroke type

Mounting hole 2.3mm .091inch type

Silver alloy

Actuator	Operating force Max.	Mounting hole 2.3 mm type		
		SPDT	SPST-NC	SPST-NO
Pin plunger (Horizontal)	2.45 N {250 gf}	ABJ261L70	ABJ262L70	ABJ263L70

Gold-clad

Actuator	Operating force Max.	Mounting hole 2.3 mm type		
		SPDT	SPST-NC	SPST-NO
Pin plunger (Horizontal)	2.45 N {250 gf}	ABJ261L71	ABJ262L71	ABJ263L71

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.

## APPLICABLE CURRENT RANGE

Contact	Applicable current range				Max. operating force for operation (at pin plunger)	
	1mA	0.1A	1A	2A	1.23 N {125 gf}	1.96 N {200 gf}
Ag					•	
						•
Au					•	
						•

## SPECIFICATIONS

### 1. Contact rating

Type	Operating force Max.	Standard rating	Low-level circuit rating
Silver alloy contact	1.76 N {180 gf}, 1.96 N {200 gf}	2 A 125 V AC 2 A 30 V DC	—
	1.23 N {125 gf}, 1.27 N {130 gf}	1 A 125 V AC 1 A 30 V DC	—
Long stroke type Silver alloy contact	2.45 N {250 gf}	1 A 125 V AC 1 A 30 V DC	—
Gold-clad contact	1.23 N {125 gf}, 1.27 N {130 gf} 1.76 N {180 gf}, 1.96 N {200 gf}	0.1 A 125 V AC	5 mA 6 V DC 2 mA 12 V DC 1 mA 24 V DC
Long stroke type Gold-clad contact	2.45 N {250 gf}	0.1 A 125 V AC 0.1 A 30 V DC	5 mA 6 V DC 2 mA 12 V DC 1 mA 24 V DC

## 2. Characteristics

Mechanical life (O.T.: Specified value)	Leaf lever, Long stroke type	Min. $5 \times 10^5$ (at 60 cpm)
	Wire leads (right & left side type)	Min. $3 \times 10^5$ (at 60 cpm)
	Other types	Min. $10^6$ (at 60 cpm)
Electrical life at rated load (O.T.: max.)	Silver alloy contact type	Min. $3 \times 10^4$ (at 60 cpm)
	Gold-clad contact type	Min. $10^5$ (at 20 cpm)
Insulation resistance	Min. 100 MΩ (at 500 V DC insulation resistance meter)	
Dielectric strength	Between non-continuous terminals	600 Vrms
	Between each terminal and other exposed metal parts	1,500 Vrms
	Between each terminal and ground	1,500 Vrms
Vibration resistance (Pin plunger type)	10 to 55 Hz at single amplitude of 0.75 mm (Contact opening max. 1 msec.)	
Shock resistance (Pin plunger type)	Min. 294 m/s <sup>2</sup> {30 G} (Contact opening max. 1 msec.)	
Contact resistance (Initial)	Silver contact type	Dust protected type (IP50): Max. 50 mΩ Immersion protected type (IP67): Max. 100 mΩ (By voltage drop 1 A 6 to 8 V DC)
	Gold clad contact type	Dust protected type (IP50): Max. 100 mΩ Immersion protected type (IP67): Max. 150 mΩ (By voltage drop 0.1 A 6 to 8 V DC)
Allowable operating speed (at no load)	1 to 500 mm/sec.	
Max. operating cycle rate (at no load)	Other type: 120 cpm Long stroke type: 60 cpm	
Ambient temperature	-40°C to +85°C -40°F to +185°F	
Ambient humidity	Max. 95% R.H.	
Unit weight	Approx. 0.5 g .018 oz (IP50 type)	

## 3. Operating characteristics

### Operating force / Release force / Pretravel

Type of actuator	Operating force, Max.		Release force, Min		Pretravel, Max. mm inch
Pin plunger	1.23N {125gf}	1.96N {200gf}	0.15N {15gf}	0.25N {25gf}	0.6 .024
Hinge lever	0.39N {40gf}	0.64N {65gf}	0.029N {3.0gf}	0.049N {5.0gf}	3.0 .118
Simulated roller lever	0.39N {40gf}	0.64N {65gf}	0.029N {3.0gf}	0.049N {5.0gf}	3.0 .118
Roller lever	0.39N {40gf}	0.64N {65gf}	0.029N {3.0gf}	0.049N {5.0gf}	3.0 .118
Leaf lever	0.98N {100gf}	1.27N {130gf}	0.20N {20gf}	0.29N {30gf}	6.0 .236
Long stroke type	2.45N {250gf}		0.19N {20gf}		—

### Movement differential / Overtravel / Operating position

Type of actuator	Movement differential, Max. mm inch	Overtravel, Min. mm inch	Operating position, mm inch		
			Mounting hole: 1.2 .047	Mounting hole: 2.3 .091	Mounting hole: 3.0 .118
Pin plunger	0.12 .005	0.25 .010	5.5±0.2 .217 ± .008	7.0±0.2 .276 ± .008	—
Hinge lever	0.5 .020	0.5 .020	6.8±1.0 .286 ± .039	8.3±1.0 .327 ± .039	—
Simulated roller lever	0.5 .020	0.5 .020	9.8±1.0 .386 ± .039	11.3±1.0 .445 ± .039	—
Roller lever	0.5 .020	0.5 .020	13.1±1.0 .516 ± .039	14.6±1.0 .575 ± .039	—
Leaf lever	1.0 .039	2.5 .098	—	—	16.0±2.0 .630 ± .079
Long stroke type	0.5 .020	2.0 .079	—	2.5±0.4 .098 ± .016	—

( ) : Low force type

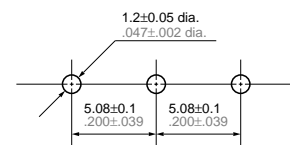
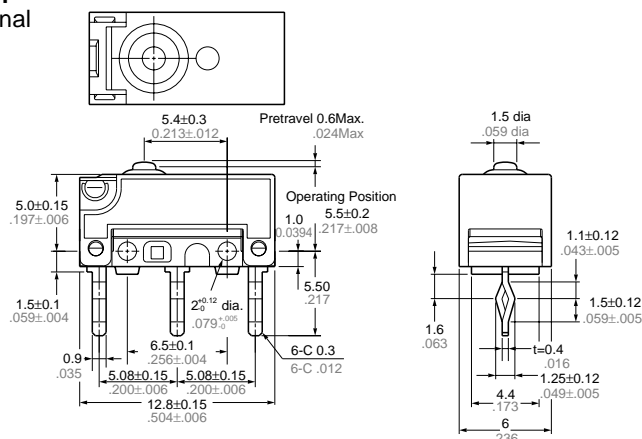
## DIMENSIONS

mm inch General tolerance: ±0.25 ±.010

### 1. Dust protected type

#### 1-(1) PC board terminal

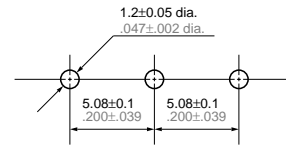
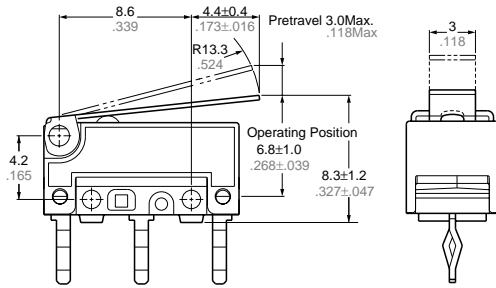
#### Pin plunger



Pretravel, Max. mm inch	0.6 .024	
Movement differential, Max. mm inch	0.12 .005	
Overtravel, Min. mm inch	0.25 .010	
Operating position	Distance from mounting hole, mm inch	5.5±0.2 .217 ± .088
	Distance from stand-off, mm inch	7±0.3 .276 ± .012

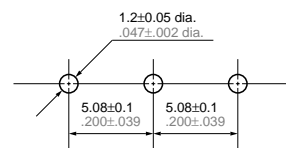
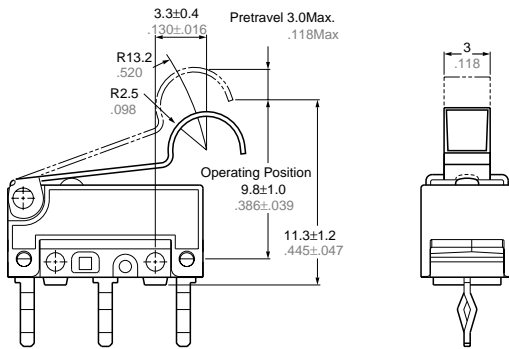
# ABJ1,2,3,4,5

## Hinge lever



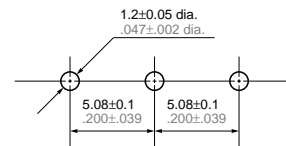
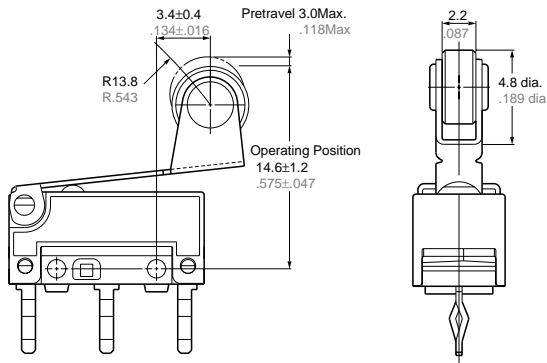
Pretravel, Max. mm inch		3.0 .118
Movement differential, Max. mm inch		0.5 .020
Overtravel, Min. mm inch		0.5 .020
Operating position	Distance from mounting hole, mm inch	6.8±1.0 .267 ± .039
	Distance from stand-off, mm inch	8.3±1.2 .327 ± .047

## Simulated roller lever



Pretravel, Max. mm inch		3.0 .118
Movement differential, Max. mm inch		0.5 .020
Overtravel, Min. mm inch		0.5 .020
Operating position	Distance from mounting hole, mm inch	9.8±1.0 .386 ± .039
	Distance from stand-off, mm inch	11.3±1.2 .445 ± .047

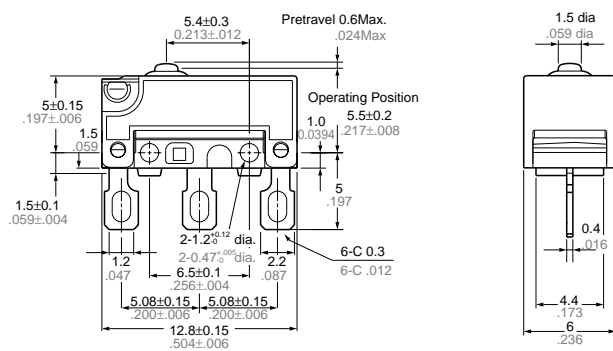
## Roller lever



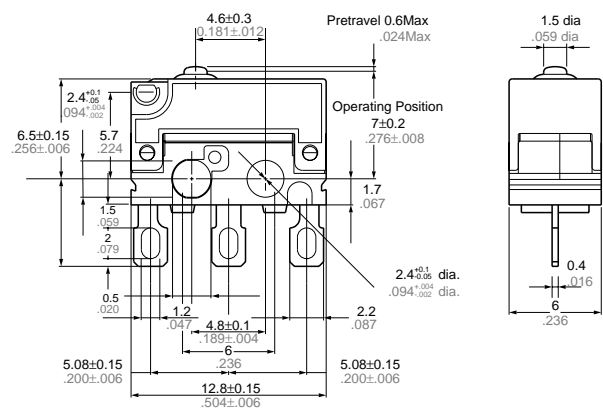
Pretravel, Max. mm inch		3.0 .118
Movement differential, Max. mm inch		0.5 .020
Overtravel, Min. mm inch		0.5 .020
Operating position	Distance from mounting hole, mm inch	13.1±1.0 .516 ± .039
	Distance from stand-off, mm inch	14.6±1.0 .575 ± .039

## 1-(2) Solder terminal Pin plunger

Mounting hole: 1.2 mm .047 inch



Mounting hole: 2.3 mm .091 inch



Remarks: Dimensions of the actuator type are the same as corresponding PC board terminal types.

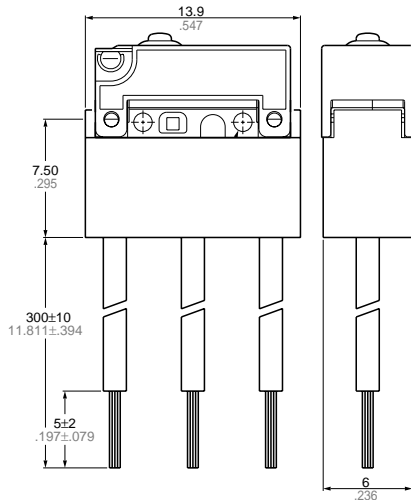
## 2. Immersion protected type

### 2-(1) Bottom wire leads type

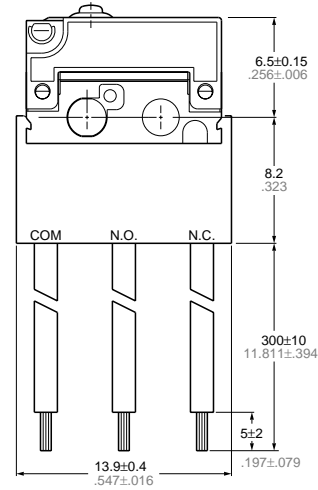
Pin plunger

Mounting hole: 1.2 mm .047 inch

Mounting hole: 2.3 mm .091 inch



Thickness of the lead wire: 0.3 mm<sup>2</sup>  
 UL/CSA approved type: AWG #20  
 Color of the lead wire:  
 COM ...Black  
 N.C. ...Red  
 N.O. ...White

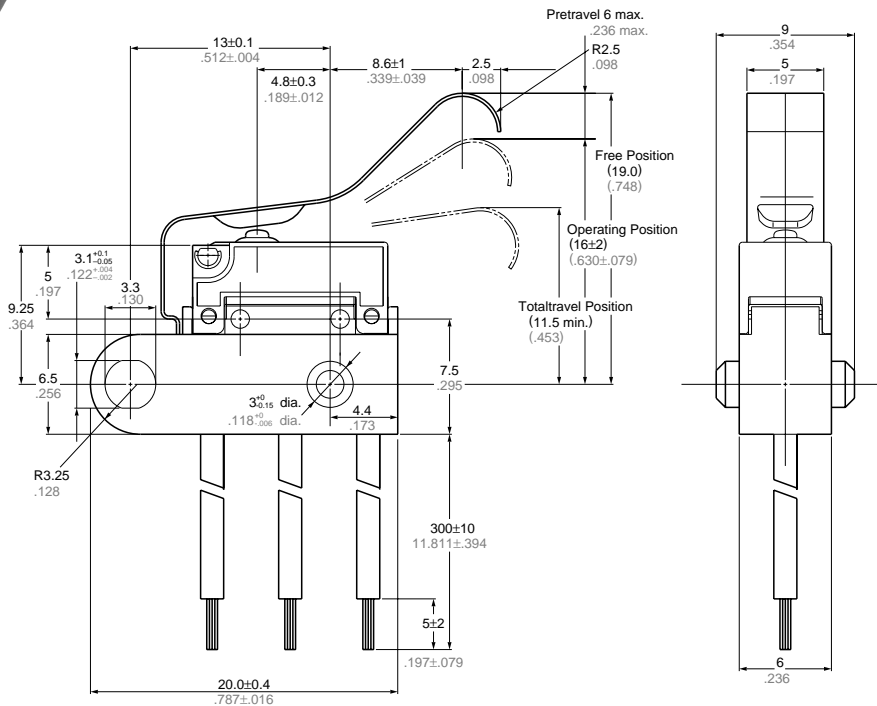
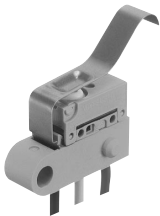


Thickness of the lead wire: 0.3 mm<sup>2</sup>  
 UL/CSA approved type: AWG #20  
 Color of the lead wire:  
 COM ...Black  
 N.C. ....Red  
 N.O. ...White

Remarks: 1. As for M1.2 type, other dimensions are the same as those of corresponding PC board terminal types.  
 As for M2.3 type, other dimensions are the same as those of corresponding solder terminal types.  
 2. Dimensions of the actuator type are the same as corresponding PC board terminal types.

## Leaf lever

Mounting hole: 3 mm .118 inch

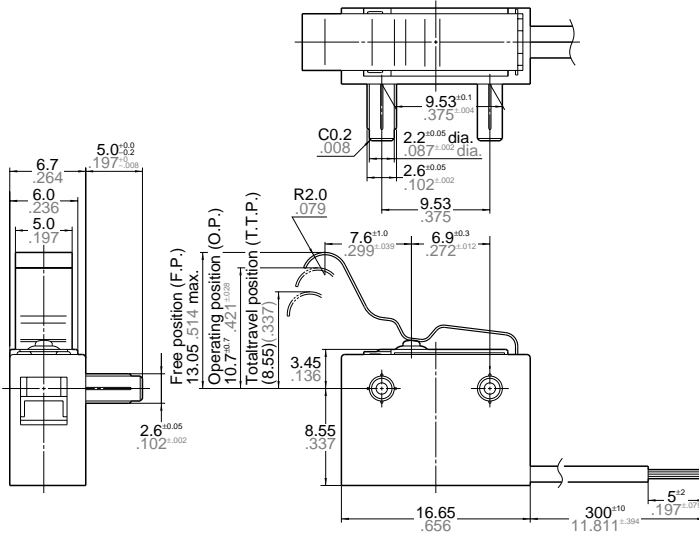
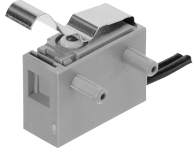


Pretravel, Max. mm inch	6.0 .236
Movement differential, Max. mm inch	1.0 .039
Overtravel, Min mm inch	2.5 .098
Operating position	Distance from mounting hole, mm inch
	16.0±2.0 .630 ± .079

# ABJ1,2,3,4,5

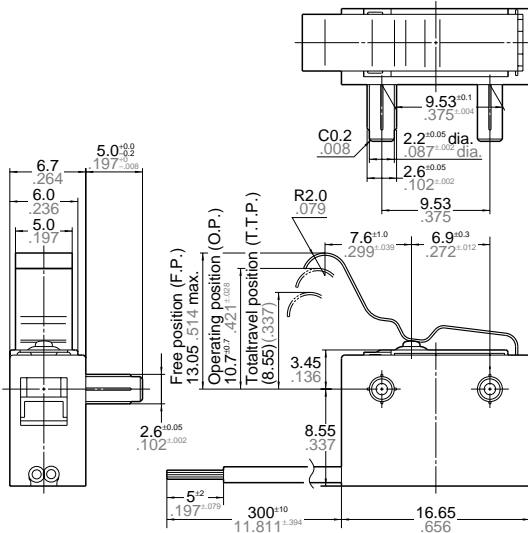
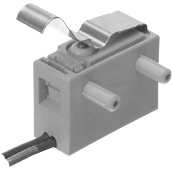
2-(2) Side wire leads type  
 Fixed pin type  
 Right side pin type  
 Right wire leads type

mm inch General tolerance:  $\pm 0.25$   $\pm 0.10$



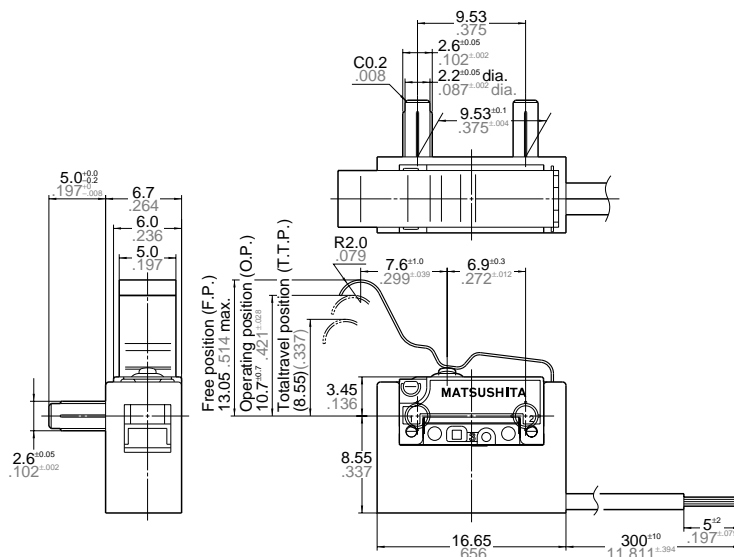
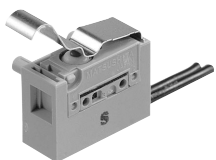
Pretravel, Max. mm inch	2.6 .102
Movement differential, Max. mm inch	0.5 .020
Overtravel, Min mm inch	1.4 .055
Operating position	Distance from mounting hole, mm inch
	10.7 $\pm$ 0.7 .421 $\pm$ .028

Left wire leads type



Pretravel, Max. mm inch	2.6 .102
Movement differential, Max. mm inch	0.5 .020
Overtravel, Min mm inch	1.4 .055
Operating position	Distance from mounting hole, mm inch
	10.7 $\pm$ 0.7 .421 $\pm$ .028

Left side pin type  
 Right wire leads type

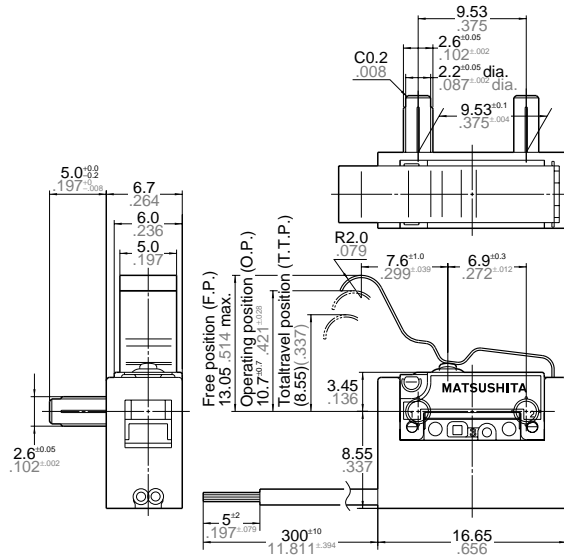


Pretravel, Max. mm inch	2.6 .102
Movement differential, Max. mm inch	0.5 .020
Overtravel, Min mm inch	1.4 .055
Operating position	Distance from mounting hole, mm inch
	10.7 $\pm$ 0.7 .421 $\pm$ .028



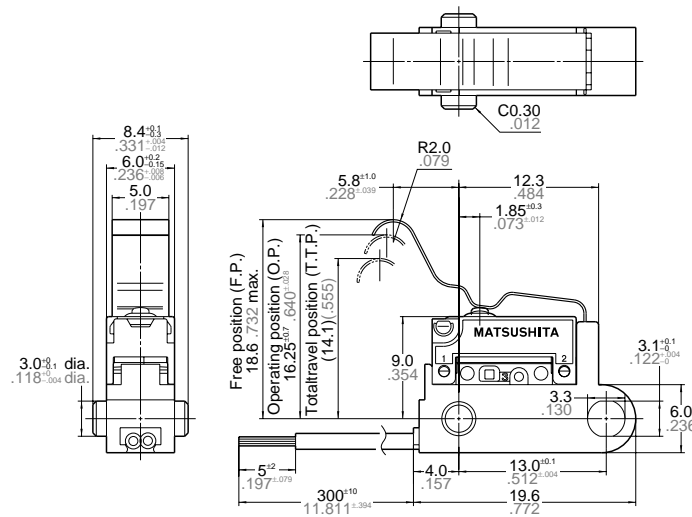
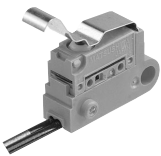
## Left wire leads type

mm inch General tolerance:  $\pm 0.25 \pm .010$



Pretravel, Max. mm inch	2.6 .102
Movement differential, Max. mm inch	0.5 .020
Overtravel, Min mm inch	1.4 .055
Operating position	Distance from mounting hole, mm inch 10.7±0.7 .421 ± .028

## Mounting hole 3mm .118 inch type



Pretravel, Max. mm inch	2.6 .102
Movement differential, Max. mm inch	0.5 .020
Overtravel, Min mm inch	1.4 .055
Operating position	Distance from mounting hole, mm inch 16.25±0.7 .640 ± .028



# NAIS

HIGH ENVIRONMENTAL RESISTANCE

# TURQUOISE SWITCHES S TYPE (ABS)



www.DataSheet4U.com

## FEATURES

- Subminiature size (19.8×11.1×6.4 mm) (.780×.437×.252 inch)
- Sealed construction for use in adverse environment-Sealed construction by epoxy resin and rubber cap keeps off the cause of miscontact such as dust. Conforming to IP67\* of IEC protective construction classification
- Elastomer double molding technology, an industry first and ultrasonic swaging technology contribute to uniform sealing in high production quantities
- Expansion of low-level circuit type
- UL/CSA/VDE/SEMKO approved (AS for gold-clad twin layer, VDE and SEMKO are not approved.)

\*Based on the protective construction classification of IEC, items which satisfy the test requirements are denoted with an IP designation.

## TYPICAL APPLICATIONS

- Automotives
- Home appliances (vacuum cleaner, air purifier)
- Others (gas cookingrange, water vallet)

## ORDERING INFORMATION

Ex. ABS 1 1 1 0 4 0

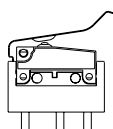
Type of switch	Wire and terminal position	Terminal	Contact arrangement	Actuator	Operating force by pin plunger (max.)	Contact
ABS: Turquoise switch S type	1: Straight type 4: Right angle 5: Left angle	1: .110 quick-connect terminal 4: Solder terminal 5: PC board terminal 6: Wire leads	1: SPDT 2: SPST-NC 3: SPST-NO	0: Pin plunger 1: Short hinge lever 2: Hinge lever 3: Long hinge lever 4: Simulated roller lever 6: Roller lever 8: Leaf lever	3: 0.74 N {75 gf} (Gold-clad double and triple layer only) 4: 0.98 N {100 gf} 5: 1.47 N {150 gf}	0: Silver-alloy 1: Gold-clad triple layer 4: Gold-clad double layer

Remarks: 1. Standard packing: Dust protected type 100 pcs./carton, 1,000 pcs./case; Immersion protected type 50 pcs./case.

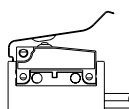
2. SPST-NC and SPST-NO are only available for wire leads type.

3. Leaf lever is only available for wire leads type

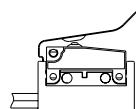
4. As for wire position:



Straight type



Wire opposite to the actuator side type (Right angle)



Wire actuator side type (Left angle)

5. Not every combination is available. Please refer to the following table, "PRODUCT TYPES".

# ABS1,4,5

## PRODUCT TYPES

### 1. Dust protected type

Silver alloy

Actuator	Operating force Max.	.110 quick-connect terminal	Solder terminal	PC board terminal		
				Straight	Right angle	Left angle
Pin plunger	0.98 N {100 gf}	ABS111040	ABS141040	ABS151040	ABS451040	ABS551040
	1.47 N {150 gf}	ABS111050	ABS141050	ABS151050	ABS451050	ABS551050
Short hinge lever	0.39 N {40 gf}	ABS111140	ABS141140	ABS151140	ABS451140	ABS551140
	0.59 N {60 gf}	ABS111150	ABS141150	ABS151150	ABS451150	ABS551150
Hinge lever	0.34 N {35 gf}	ABS111240	ABS141240	ABS151240	ABS451240	ABS551240
	0.54 N {55 gf}	ABS111250	ABS141250	ABS151250	ABS451250	ABS551250
Long hinge lever	0.25 N {25 gf}	ABS111340	ABS141340	ABS151340	ABS451340	ABS551340
	0.44 N {45 gf}	ABS111350	ABS141350	ABS151350	ABS451350	ABS551350
Simulated roller lever	0.34 N {35 gf}	ABS111440	ABS141440	ABS151440	ABS451440	ABS551440
	0.54 N {55 gf}	ABS111450	ABS141450	ABS151450	ABS451450	ABS551450
Roller lever	0.39 N {40 gf}	ABS111640	ABS141640	ABS151640	ABS451640	ABS551640
	0.59 N {60 gf}	ABS111650	ABS141650	ABS151650	ABS451650	ABS551650

### Gold-clad triple layer

Actuator	Operating force Max.	.110 quick-connect terminal	Solder terminal	PC board terminal		
				Straight	Right angle	Left angle
Pin plunger	0.74 N {75 gf}	ABS111031	ABS141031	ABS151031	ABS451031	ABS551031
	0.98 N {100 gf}	ABS111041	ABS141041	ABS151041	ABS451041	ABS551041
	1.47 N {150 gf}	ABS111051	ABS141051	ABS151051	ABS451051	ABS551051
Short hinge lever	0.29 N {30 gf}	ABS111131	ABS141131	ABS151131	ABS451131	ABS551131
	0.39 N {40 gf}	ABS111141	ABS141141	ABS151141	ABS451141	ABS551141
	0.59 N {60 gf}	ABS111151	ABS141151	ABS151151	ABS451151	ABS551151
Hinge lever	0.27 N {28 gf}	ABS111231	ABS141231	ABS151231	ABS451231	ABS551231
	0.34 N {35 gf}	ABS111241	ABS141241	ABS151241	ABS451241	ABS551241
	0.54 N {55 gf}	ABS111251	ABS141251	ABS151251	ABS451251	ABS551251
Long hinge lever	0.23 N {23 gf}	ABS111331	ABS141331	ABS151331	ABS451331	ABS551331
	0.25 N {25 gf}	ABS111341	ABS141341	ABS151341	ABS451341	ABS551341
	0.44 N {45 gf}	ABS111351	ABS141351	ABS151351	ABS451351	ABS551351
Simulated roller lever	0.27 N {28 gf}	ABS111431	ABS141431	ABS151431	ABS451431	ABS551431
	0.34 N {35 gf}	ABS111441	ABS141441	ABS151441	ABS451441	ABS551441
	0.54 N {55 gf}	ABS111451	ABS141451	ABS151451	ABS451451	ABS551451
Roller lever	0.29 N {30 gf}	ABS111631	ABS141631	ABS151631	ABS451631	ABS551631
	0.39 N {40 gf}	ABS111641	ABS141641	ABS151641	ABS451641	ABS551641
	0.59 N {60 gf}	ABS111651	ABS141651	ABS151651	ABS451651	ABS551651

### Gold-clad double layer

Actuator	Operating force Max.	.110 quick-connect terminal	Solder terminal	PC board terminal		
				Straight	Right angle	Left angle
Pin plunger	0.74 N {75 gf}	ABS111034	ABS141034	ABS151034	ABS451034	ABS551034
	0.98 N {100 gf}	ABS111044	ABS141044	ABS151044	ABS451044	ABS551044
	1.47 N {150 gf}	ABS111054	ABS141054	ABS151054	ABS451054	ABS551054
Short hinge lever	0.29 N {30 gf}	ABS111134	ABS141134	ABS151134	ABS451134	ABS551134
	0.39 N {40 gf}	ABS111144	ABS141144	ABS151144	ABS451144	ABS551144
	0.59 N {60 gf}	ABS111154	ABS141154	ABS151154	ABS451154	ABS551154
Hinge lever	0.27 N {28 gf}	ABS111234	ABS141234	ABS151234	ABS451234	ABS551234
	0.34 N {35 gf}	ABS111244	ABS141244	ABS151244	ABS451244	ABS551244
	0.54 N {55 gf}	ABS111254	ABS141254	ABS151254	ABS451254	ABS551254
Long hinge lever	0.23 N {23 gf}	ABS111334	ABS141334	ABS151334	ABS451334	ABS551334
	0.25 N {25 gf}	ABS111344	ABS141344	ABS151344	ABS451344	ABS551344
	0.44 N {45 gf}	ABS111354	ABS141354	ABS151354	ABS451354	ABS551354
Simulated roller lever	0.27 N {28 gf}	ABS111434	ABS141434	ABS151434	ABS451434	ABS551434
	0.34 N {35 gf}	ABS111444	ABS141444	ABS151444	ABS451444	ABS551444
	0.54 N {55 gf}	ABS111454	ABS141454	ABS151454	ABS451454	ABS551454
Roller lever	0.29 N {30 gf}	ABS111634	ABS141634	ABS151634	ABS451634	ABS551634
	0.39 N {40 gf}	ABS111644	ABS141644	ABS151644	ABS451644	ABS551644
	0.59 N {60 gf}	ABS111654	ABS141654	ABS151654	ABS451654	ABS551654

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.

**2. Immersion protected type (3 wire leads type SPDT)**

Silver alloy

Actuator	Operating force Max.	SPDT		
		Straight	Wire position Right angle	Left angle
Pin plunger	0.98 N {100 gf}	ABS161040	ABS461040	ABS561040
	1.47 N {150 gf}	ABS161050	ABS461050	ABS561050
Short hinge lever	0.39 N {40 gf}	ABS161140	ABS461140	ABS561140
	0.59 N {60 gf}	ABS161150	ABS461150	ABS561150
Hinge lever	0.34 N {35 gf}	ABS161240	ABS461240	ABS561240
	0.54 N {55 gf}	ABS161250	ABS461250	ABS561250
Long hinge lever	0.25 N {25 gf}	ABS161340	ABS461340	ABS561340
	0.44 N {45 gf}	ABS161350	ABS461350	ABS561350
Simulated roller lever	0.34 N {35 gf}	ABS161440	ABS461440	ABS561440
	0.54 N {55 gf}	ABS161450	ABS461450	ABS561450
Roller lever	0.39 N {40 gf}	ABS161640	ABS461640	ABS561640
	0.59 N {60 gf}	ABS161650	ABS461650	ABS561650

## Gold-clad triple layer

Actuator	Operating force Max.	SPDT		
		Straight	Wire position Right angle	Left angle
Pin plunger	0.74 N {75 gf}	ABS161031	ABS461031	ABS561031
	0.98 N {100 gf}	ABS161041	ABS461041	ABS561041
	1.47 N {150 gf}	ABS161051	ABS461051	ABS561051
Short hinge lever	0.29 N {30 gf}	ABS161131	ABS461131	ABS561131
	0.39 N {40 gf}	ABS161141	ABS461141	ABS561141
	0.59 N {60 gf}	ABS161151	ABS461151	ABS561151
Hinge lever	0.27 N {28 gf}	ABS161231	ABS461231	ABS561231
	0.34 N {35 gf}	ABS161241	ABS461241	ABS561241
	0.54 N {55 gf}	ABS161251	ABS461251	ABS561251
Long hinge lever	0.23 N {23 gf}	ABS161331	ABS461331	ABS561331
	0.25 N {25 gf}	ABS161341	ABS461341	ABS561341
	0.44 N {45 gf}	ABS161351	ABS461351	ABS561351
Simulated roller lever	0.27 N {28 gf}	ABS161431	ABS461431	ABS561431
	0.34 N {35 gf}	ABS161441	ABS461441	ABS561441
	0.54 N {55 gf}	ABS161451	ABS461451	ABS561451
Roller lever	0.29 N {30 gf}	ABS161631	ABS461631	ABS561631
	0.39 N {40 gf}	ABS161641	ABS461641	ABS561641
	0.59 N {60 gf}	ABS161651	ABS461651	ABS561651

## Gold-clad double layer

Actuator	Operating force Max.	SPDT		
		Straight	Wire position Right angle	Left angle
Pin plunger	0.74 N {75 gf}	ABS161034	ABS461034	ABS561034
	0.98 N {100 gf}	ABS161044	ABS461044	ABS561044
	1.47 N {150 gf}	ABS161054	ABS461054	ABS561054
Short hinge lever	0.29 N {30 gf}	ABS161134	ABS461134	ABS561134
	0.39 N {40 gf}	ABS161144	ABS461144	ABS561144
	0.59 N {60 gf}	ABS161154	ABS461154	ABS561154
Hinge lever	0.27 N {28 gf}	ABS161234	ABS461234	ABS561234
	0.34 N {35 gf}	ABS161244	ABS461244	ABS561244
	0.54 N {55 gf}	ABS161254	ABS461254	ABS561254
Long hinge lever	0.23 N {23 gf}	ABS161334	ABS461334	ABS561334
	0.25 N {25 gf}	ABS161344	ABS461344	ABS561344
	0.44 N {45 gf}	ABS161354	ABS461354	ABS561354
Simulated roller lever	0.27 N {28 gf}	ABS161434	ABS461434	ABS561434
	0.34 N {35 gf}	ABS161444	ABS461444	ABS561444
	0.54 N {55 gf}	ABS161454	ABS461454	ABS561454
Roller lever	0.29 N {30 gf}	ABS161634	ABS461634	ABS561634
	0.39 N {40 gf}	ABS161644	ABS461644	ABS561644
	0.59 N {60 gf}	ABS161654	ABS461654	ABS561654

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.

# ABS1,4,5

## 3. Immersion protected type (2 wire leads type SPST-NC)

Silver alloy

Actuator	Operating force Max.	SPST-NC		
		Straight	Wire position Right angle	Left angle
Pin plunger	0.98 N {100 gf}	ABS162040	ABS462040	ABS562040
	1.47 N {150 gf}	ABS162050	ABS462050	ABS562050
Short hinge lever	0.39 N {40 gf}	ABS162140	ABS462140	ABS562140
	0.59 N {60 gf}	ABS162150	ABS462150	ABS562150
Hinge lever	0.34 N {35 gf}	ABS162240	ABS462240	ABS562240
	0.54 N {55 gf}	ABS162250	ABS462250	ABS562250
Long hinge lever	0.25 N {25 gf}	ABS162340	ABS462340	ABS562340
	0.44 N {45 gf}	ABS162350	ABS462350	ABS562350
Simulated roller lever	0.34 N {35 gf}	ABS162440	ABS462440	ABS562440
	0.54 N {55 gf}	ABS162450	ABS462450	ABS562450
Roller lever	0.39 N {40 gf}	ABS162640	ABS462640	ABS562640
	0.59 N {60 gf}	ABS162650	ABS462650	ABS562650

## Gold-clad triple layer

Actuator	Operating force Max.	SPST-NC		
		Straight	Wire position Right angle	Left angle
Pin plunger	0.74 N {75 gf}	ABS162031	ABS462031	ABS562031
	0.98 N {100 gf}	ABS162041	ABS462041	ABS562041
	1.47 N {150 gf}	ABS162051	ABS462051	ABS562051
Short hinge lever	0.29 N {30 gf}	ABS162131	ABS462131	ABS562131
	0.39 N {40 gf}	ABS162141	ABS462141	ABS562141
	0.59 N {60 gf}	ABS162151	ABS462151	ABS562151
Hinge lever	0.27 N {28 gf}	ABS162231	ABS462231	ABS562231
	0.34 N {35 gf}	ABS162241	ABS462241	ABS562241
	0.54 N {55 gf}	ABS162251	ABS462251	ABS562251
Long hinge lever	0.23 N {23 gf}	ABS162331	ABS462331	ABS562331
	0.25 N {25 gf}	ABS162341	ABS462341	ABS562341
	0.44 N {45 gf}	ABS162351	ABS462351	ABS562351
Simulated roller lever	0.27 N {28 gf}	ABS162431	ABS462431	ABS562431
	0.34 N {35 gf}	ABS162441	ABS462441	ABS562441
	0.54 N {55 gf}	ABS162451	ABS462451	ABS562451
Roller lever	0.29 N {30 gf}	ABS162631	ABS462631	ABS562631
	0.39 N {40 gf}	ABS162641	ABS462641	ABS562641
	0.59 N {60 gf}	ABS162651	ABS462651	ABS562651

## Gold-clad double layer

Actuator	Operating force Max.	SPST-NC		
		Straight	Wire position Right angle	Left angle
Pin plunger	0.74 N {75 gf}	ABS162034	ABS462034	ABS562034
	0.98 N {100 gf}	ABS162044	ABS462044	ABS562044
	1.47 N {150 gf}	ABS162054	ABS462054	ABS562054
Short hinge lever	0.29 N {30 gf}	ABS162134	ABS462134	ABS562134
	0.39 N {40 gf}	ABS162144	ABS462144	ABS562144
	0.59 N {60 gf}	ABS162154	ABS462154	ABS562154
Hinge lever	0.27 N {28 gf}	ABS162234	ABS462234	ABS562234
	0.34 N {35 gf}	ABS162244	ABS462244	ABS562244
	0.54 N {55 gf}	ABS162254	ABS462254	ABS562254
Long hinge lever	0.23 N {23 gf}	ABS162334	ABS462334	ABS562334
	0.25 N {25 gf}	ABS162344	ABS462344	ABS562344
	0.44 N {45 gf}	ABS162354	ABS462354	ABS562354
Simulated roller lever	0.27 N {28 gf}	ABS162434	ABS462434	ABS562434
	0.34 N {35 gf}	ABS162444	ABS462444	ABS562444
	0.54 N {55 gf}	ABS162454	ABS462454	ABS562454
Roller lever	0.29 N {30 gf}	ABS162634	ABS462634	ABS562634
	0.39 N {40 gf}	ABS162644	ABS462644	ABS562644
	0.59 N {60 gf}	ABS162654	ABS462654	ABS562654

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.

**4. Immersion protected type (2 wire leads type SPST-NO)**

Silver alloy

Actuator	Operating force Max.	SPST-NO		
		Straight	Wire position Right angle	Left angle
Pin plunger	0.98 N {100 gf}	ABS163040	ABS463040	ABS563040
	1.47 N {150 gf}	ABS163050	ABS463050	ABS563050
Short hinge lever	0.39 N {40 gf}	ABS163140	ABS463140	ABS563140
	0.59 N {60 gf}	ABS163150	ABS463150	ABS563150
Hinge lever	0.34 N {35 gf}	ABS163240	ABS463240	ABS563240
	0.54 N {55 gf}	ABS163250	ABS463250	ABS563250
Long hinge lever	0.25 N {25 gf}	ABS163340	ABS463340	ABS563340
	0.44 N {45 gf}	ABS163350	ABS463350	ABS563350
Simulated roller lever	0.34 N {35 gf}	ABS163440	ABS463440	ABS563440
	0.54 N {55 gf}	ABS163450	ABS463450	ABS563450
Roller lever	0.39 N {40 gf}	ABS163640	ABS463640	ABS563640
	0.59 N {60 gf}	ABS163650	ABS463650	ABS563650

## Gold-clad triple layer

Actuator	Operating force Max.	SPST-NO		
		Straight	Wire position Right angle	Left angle
Pin plunger	0.74 N {75 gf}	ABS163031	ABS463031	ABS563031
	0.98 N {100 gf}	ABS163041	ABS463041	ABS563041
	1.47 N {150 gf}	ABS163051	ABS463051	ABS563051
Short hinge lever	0.29 N {30 gf}	ABS163131	ABS463131	ABS563131
	0.39 N {40 gf}	ABS163141	ABS463141	ABS563141
	0.59 N {60 gf}	ABS163151	ABS463151	ABS563151
Hinge lever	0.27 N {28 gf}	ABS163231	ABS463231	ABS563231
	0.34 N {35 gf}	ABS163241	ABS463241	ABS563241
	0.54 N {55 gf}	ABS163251	ABS463251	ABS563251
Long hinge lever	0.23 N {23 gf}	ABS163331	ABS463331	ABS563331
	0.25 N {25 gf}	ABS163341	ABS463341	ABS563341
	0.44 N {45 gf}	ABS163351	ABS463351	ABS563351
Simulated roller lever	0.27 N {28 gf}	ABS163431	ABS463431	ABS563431
	0.34 N {35 gf}	ABS163441	ABS463441	ABS563441
	0.54 N {55 gf}	ABS163451	ABS463451	ABS563451
Roller lever	0.29 N {30 gf}	ABS163631	ABS463631	ABS563631
	0.39 N {40 gf}	ABS163641	ABS463641	ABS563641
	0.59 N {60 gf}	ABS163651	ABS463651	ABS563651

## Gold-clad double layer

Actuator	Operating force Max.	SPST-NO		
		Straight	Wire position Right angle	Left angle
Pin plunger	0.74 N {75 gf}	ABS163034	ABS463034	ABS563034
	0.98 N {100 gf}	ABS163044	ABS463044	ABS563044
	1.47 N {150 gf}	ABS163054	ABS463054	ABS563054
Short hinge lever	0.29 N {30 gf}	ABS163134	ABS463134	ABS563134
	0.39 N {40 gf}	ABS163144	ABS463144	ABS563144
	0.59 N {60 gf}	ABS163154	ABS463154	ABS563154
Hinge lever	0.27 N {28 gf}	ABS163234	ABS463234	ABS563234
	0.34 N {35 gf}	ABS163244	ABS463244	ABS563244
	0.54 N {55 gf}	ABS163254	ABS463254	ABS563254
Long hinge lever	0.23 N {23 gf}	ABS163334	ABS463334	ABS563334
	0.25 N {25 gf}	ABS163344	ABS463344	ABS563344
	0.44 N {45 gf}	ABS163354	ABS463354	ABS563354
Simulated roller lever	0.27 N {28 gf}	ABS163434	ABS463434	ABS563434
	0.34 N {35 gf}	ABS163444	ABS463444	ABS563444
	0.54 N {55 gf}	ABS163454	ABS463454	ABS563454
Roller lever	0.29 N {30 gf}	ABS163634	ABS463634	ABS563634
	0.39 N {40 gf}	ABS163644	ABS463644	ABS563644
	0.59 N {60 gf}	ABS163654	ABS463654	ABS563654

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.

# ABS1,4,5

## 5. Immersion protected type (3 wire leads type SPDT)

- Leaf lever type
- Silver alloy

Actuator	Operating force Max.	SPDT		
		Straight	Wire position Right angle	Left angle
Leaf lever	0.88 N {90 gf}	ABS161840	ABS461840	ABS561840
	1.08 N {110 gf}	ABS161850	ABS461850	ABS561850

### Gold-clad triple layer

Actuator	Operating force Max.	SPDT		
		Straight	Wire position Right angle	Left angle
Leaf lever	0.74 N {75 gf}	ABS161831	ABS461831	ABS561831
	0.88 N {90 gf}	ABS161841	ABS461841	ABS561841
	1.08 N {110 gf}	ABS161851	ABS461851	ABS561851

### Gold-clad double layer

Actuator	Operating force Max.	SPDT		
		Straight	Wire position Right angle	Left angle
Leaf lever	0.74 N {75 gf}	ABS161834	ABS461834	ABS561834
	0.88 N {90 gf}	ABS161844	ABS461844	ABS561844
	1.08 N {110 gf}	ABS161854	ABS461854	ABS561854

## 6. Immersion protected type (2 wire leads type SPST-NC)

- Leaf lever type
- Silver alloy

Actuator	Operating force Max.	SPST-NC		
		Straight	Wire position Right angle	Left angle
Leaf lever	0.88 N {90 gf}	ABS162840	ABS462840	ABS562840
	1.08 N {110 gf}	ABS162850	ABS462850	ABS562850

### Gold-clad triple layer

Actuator	Operating force Max.	SPST-NC		
		Straight	Wire position Right angle	Left angle
Leaf lever	0.74 N {75 gf}	ABS162831	ABS462831	ABS562831
	0.88 N {90 gf}	ABS162841	ABS462841	ABS562841
	1.08 N {110 gf}	ABS162851	ABS462851	ABS562851

### Gold-clad double layer

Actuator	Operating force Max.	SPST-NC		
		Straight	Wire position Right angle	Left angle
Leaf lever	0.74 N {75 gf}	ABS162834	ABS462834	ABS562834
	0.88 N {90 gf}	ABS162844	ABS462844	ABS562844
	1.08 N {110 gf}	ABS162854	ABS462854	ABS562854

## 7. Immersion protected type (2 wire leads type SPST-NO)

- Leaf lever type
- Silver alloy

Actuator	Operating force Max.	SPST-NO		
		Straight	Wire position Right angle	Left angle
Leaf lever	0.88 N {90 gf}	ABS163840	ABS463840	ABS563840
	1.08 N {110 gf}	ABS163850	ABS463850	ABS563850

### Gold-clad triple layer

Actuator	Operating force Max.	SPST-NO		
		Straight	Wire position Right angle	Left angle
Leaf lever	0.74 N {75 gf}	ABS163831	ABS463831	ABS563831
	0.88 N {90 gf}	ABS163841	ABS463841	ABS563841
	1.08 N {110 gf}	ABS163851	ABS463851	ABS563851

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.



## Gold-clad double layer

Actuator	Operating force Max. gf oz	SPST-NO		
		Straight	Wire position Right angle	Left angle
Leaf lever	0.74 N {75 gf}	ABS163834	ABS463834	ABS563834
	0.89 N {90 gf}	ABS163844	ABS463844	ABS563844
	1.08 N {110 gf}	ABS162854	ABS462854	ABS562854

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.

## SPECIFICATIONS

### 1. Contact rating

Voltage	Silver alloy contact type		Gold-clad contact type	
			Gold-clad triple layer	Gold-clad twin layer
	Resistive load	Inductive load	Resistive load	
125 V AC	2 A	2 A	0.1 A	—
250 V AC	2 A	2 A	0.1 A	—
30 V DC	2 A	2 A	0.1 A	0.1 A
125 V DC	0.4 A	0.05 A	—	—

Recommended contact material chart classified by load voltage & current



Remarks: If the contact is being used in the constant low-level circuit load range, the gold-clad twin layer contact is recommended. If there is a danger of the current being less than 0.5 A, for instance if the contact is being turned on and off, the gold-clad triple layer type is recommended.

### Low-level circuit rating (Gold-clad contact type)

Rated voltage	Resistive load
6 V DC	5 mA
12 V DC	2 mA
24 V DC	1 mA

### 2. Characteristics

Mechanical life (O.T.: Specified value)	Leaf lever	Min. 5x10 <sup>5</sup> (at 60 cpm)
	Other types	Min. 5x10 <sup>6</sup> (at 60 cpm)
Electrical life at rated load (O.T.: Max.)	Silver alloy contact type	Min. 5x10 <sup>4</sup> (at 20 cpm)
	Gold-clad contact type	Min. 2x10 <sup>5</sup> (at 20 cpm)
Insulation resistance	Min. 100 MΩ (at 500 V DC insulation resistance meter)	
Dielectric strength	1,000 Vrms	
Between non-continuous terminals	1,500 Vrms	
Between each terminal and other exposed metal parts	1,500 Vrms	
Between each terminal and ground		
Vibration resistance (Pin plunger type)	10 to 55 Hz at single amplitude of 0.75 mm (Contact opening Max. 1 msec.)	
Shock resistance (Pin plunger type)	Min. 294 m/s <sup>2</sup> {30 G} (Contact opening Max. 1 msec.)	
Contact resistance (Initial)	Silver alloy contact type	Dust protected type (IP50): Max. 50 mΩ Immersion protected type (IP67): Max. 100 mΩ (By voltage drop 1 A 6 to 8 V DC)
	Gold-clad contact type	Dust protected type (IP50): Max. 100 mΩ Immersion protected type (IP67): Max. 150 mΩ (By voltage drop 0.1 A 6 to 8 V DC)
Allowable operating speed (at no load)	0.1 to 500 mm/sec.	
Max. operating cycle rate (at no load)	120 cpm	
Ambient temperature	-40°C to +85°C -40°F to +185°F	
Ambient humidity	Max. 95% R.H.	
Unit weight	Approx. 2 g .071 oz (IP50 type)	

### 3. Operating characteristics

Type of actuator	Operating force, Max.			Release force, Min.			Pretravel, Max. mm inch	Movement differential, Max. mm inch	Overtravel, Min. mm inch	Operating position, mm inch
Pin plunger	0.74N {75gf}	0.98N {100gf}	1.47N {150gf}	0.098N {10gf}	0.15N {15gf}	0.20N {20gf}	0.6 .024	0.1 .004	0.4 .016	8.4±0.3 .331 ± .012
Short hinge lever	0.29N {30gf}	0.39N {40gf}	0.59N {60gf}	0.020N {2.0gf}	0.034N {3.5gf}	0.039N {4.0gf}	2.5 .098	0.5 .020	0.8 .031	8.8±0.8 .346 ± .031
Hinge lever	0.27N {28gf}	0.34N {35gf}	0.54N {55gf}	0.017N {1.70gf}	0.029N {3.0gf}	0.034N {3.5gf}	2.8 .110	0.8 .031	1.2 .047	8.8±0.8 .346 ± .031
Long hinge lever	0.23N {23gf}	0.25N {25gf}	0.44N {45gf}	0.015N {1.5gf}	0.025N {2.5gf}	0.029N {3.0gf}	3.5 .138	1.0 .039	1.6 .063	8.8±1.2 .346 ± .047
Simulated roller lever	0.27N {28gf}	0.34N {35gf}	0.54N {55gf}	0.017N {1.7gf}	0.029N {3.0gf}	0.034N {3.5gf}	2.8 .110	0.8 .031	1.2 .047	11.65±0.8 .459 ± .031
Roller lever	0.29N {30gf}	0.39N {40gf}	0.59N {60gf}	0.020N {2.0gf}	0.034N {3.5gf}	0.039N {4.0gf}	2.5 .098	0.5 .020	0.8 .031	14.5±0.8 .571 ± .031
Leaf lever	0.74N {75gf}	0.88N {90gf}	1.08N {110gf}	0.15N {15gf}	0.17N {17gf}	0.20N {20gf}	4.5 .177	1.0 .039	2.5 .098	14.5±1.5 .571 ± .059

# ABS1,4,5

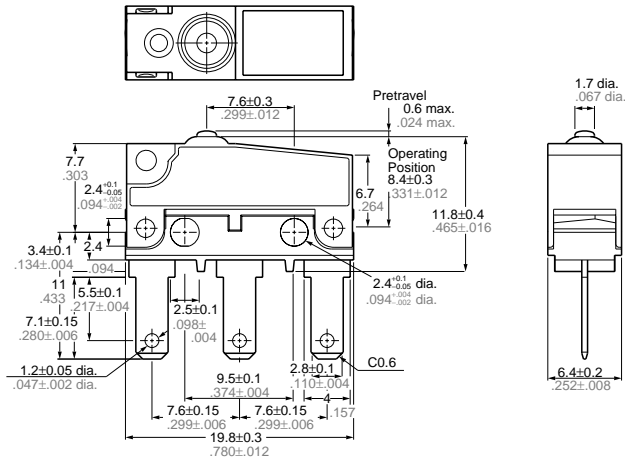
## DIMENSIONS

mm inch General tolerance:  $\pm 0.25 \pm .010$

### 1. Dust protected type

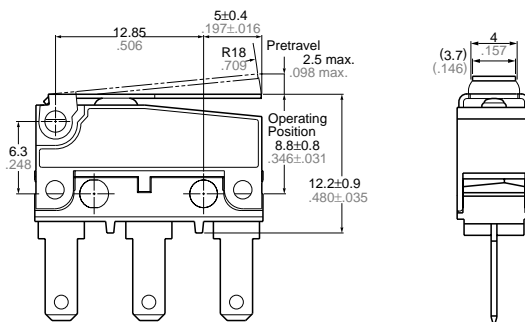
1-(1) .110 quick-connect terminal

Pin plunger



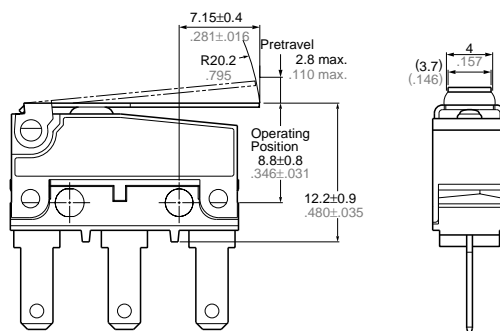
Pretravel, Max. mm inch		0.6 .024
Movement differential, Max. mm inch		0.1 .004
Overtravel, Min. mm inch		0.4 .016
Operating position	Distance from mounting hole, mm inch	$8.4 \pm 0.3$ .331 $\pm$ .012
	Distance from stand-off, mm inch	$11.8 \pm 0.4$ .465 $\pm$ .016

### Short hinge lever



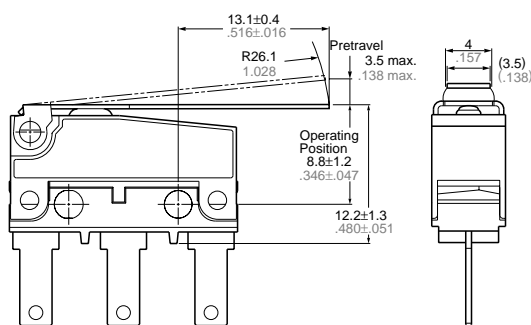
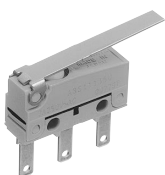
Pretravel, Max. mm inch		2.5 .098
Movement differential, Max. mm inch		0.5 .020
Overtravel, Min. mm inch		0.8 .031
Operating position	Distance from mounting hole, mm inch	$8.8 \pm 0.8$ .346 $\pm$ .031
	Distance from stand-off, mm inch	$12.2 \pm 0.9$ .480 $\pm$ .035

### Hinge lever



Pretravel, Max. mm inch		2.8 .110
Movement differential, Max. mm inch		0.8 .031
Overtravel, Min. mm inch		1.2 .047
Operating position	Distance from mounting hole, mm inch	$8.8 \pm 0.8$ .346 $\pm$ .031
	Distance from stand-off, mm inch	$12.2 \pm 0.9$ .480 $\pm$ .035

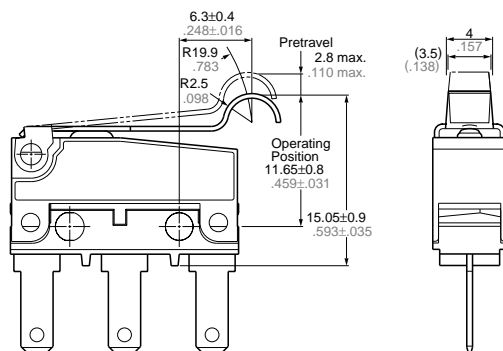
### Long hinge lever



Pretravel, Max. mm inch		3.5 .138
Movement differential, Max. mm inch		1 .039
Overtravel, Min. mm inch		1.6 .063
Operating position	Distance from mounting hole, mm inch	$8.8 \pm 1.2$ .346 $\pm$ .047
	Distance from stand-off, mm inch	$12.2 \pm 1.3$ .480 $\pm$ .051

## Simulated roller lever

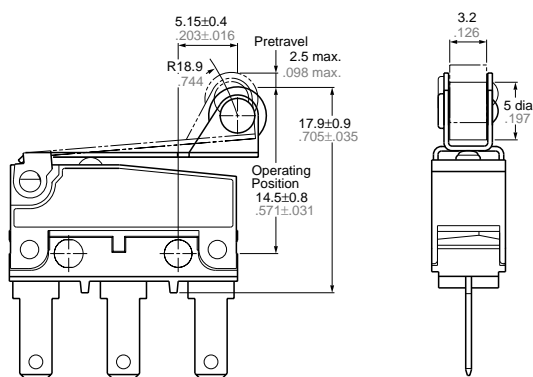
mm inch General tolerance:  $\pm 0.25 \pm .010$



Pretravel, Max. mm inch	2.8 .110	
Movement differential, Max. mm inch	0.8 .031	
Overtravel, Min. mm inch	1.2 .047	
Operating position	Distance from mounting hole, mm inch	$11.65 \pm 0.8$ $.459 \pm .031$
	Distance from stand-off, mm inch	$15.05 \pm 0.9$ $.593 \pm .035$

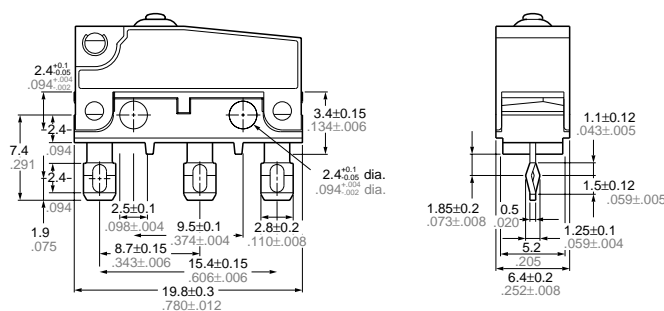
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## Roller lever



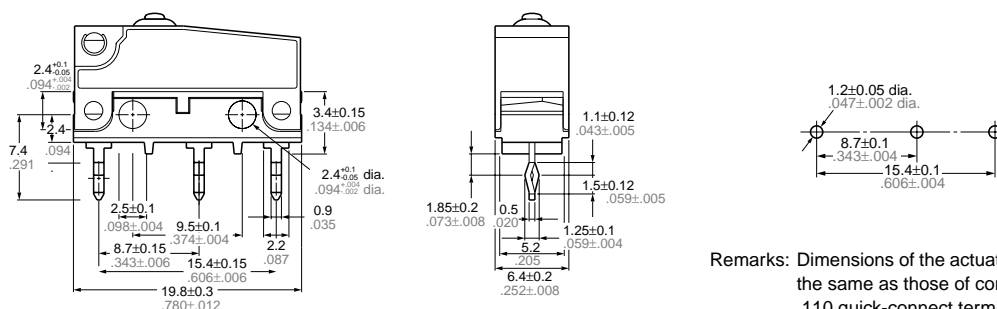
Pretravel, Max. mm inch	2.5 .098	
Movement differential, Max. mm inch	0.5 .020	
Overtravel, Min. mm inch	0.8 .031	
Operating position	Distance from mounting hole, mm inch	$14.5 \pm 0.8$ $.571 \pm .031$
	Distance from stand-off, mm inch	$17.9 \pm 0.9$ $.705 \pm .035$

## 1-(2) Solder terminal



Remarks: Dimensions of the actuator types are the same as those of corresponding .110 quick-connect terminal types.

## 1-(3) PC board terminal Straight type

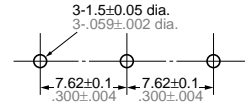
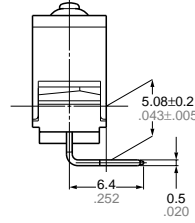
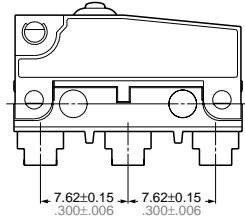
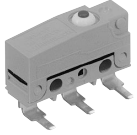


Remarks: Dimensions of the actuator types are the same as those of corresponding .110 quick-connect terminal types.

# ABS1,4,5

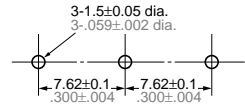
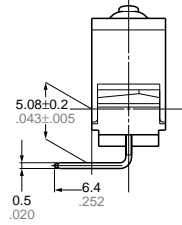
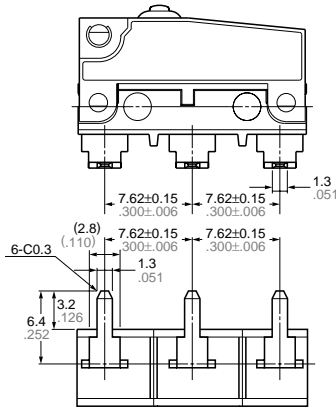
Right angle type

mm inch General tolerance:  $\pm 0.25 \pm .010$



Remarks: Dimensions of the actuator types are the same as those of corresponding .110 quick-connect terminal types.

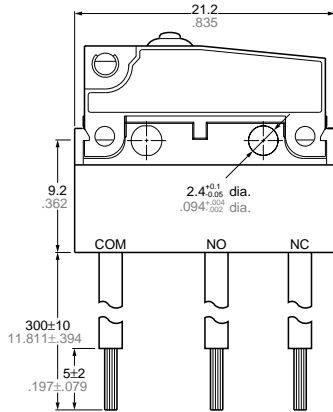
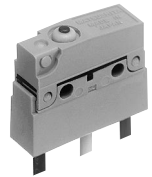
Left angle type



Remarks: Dimensions of the actuator types are the same as those of corresponding .110 quick-connect terminal types.

## 2. Immersion protected type

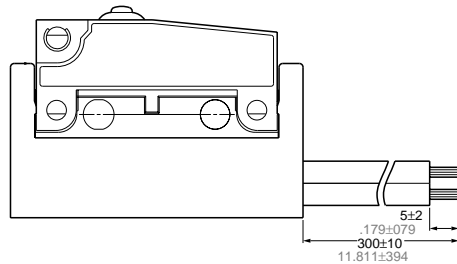
Wire leads  
Pin plunger  
Straight type



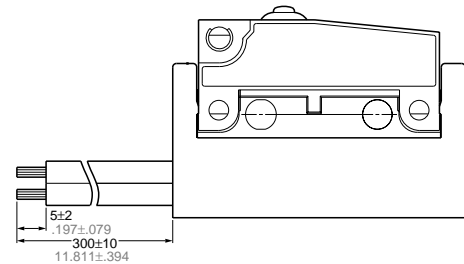
Thickness of the lead wire: 0.5 mm<sup>2</sup>  
UL/CSA approved type and Right/Left angle type:  
AWG #20  
Color of the lead wire:  
COM... Black  
N.C. ... Red  
N.O. ... White

Remarks: 1. Other dimensions are the same as those of .110 quick-connect terminal types.  
2. Dimensions of the actuator types are the same as those of corresponding .110 quick-connect terminal types.

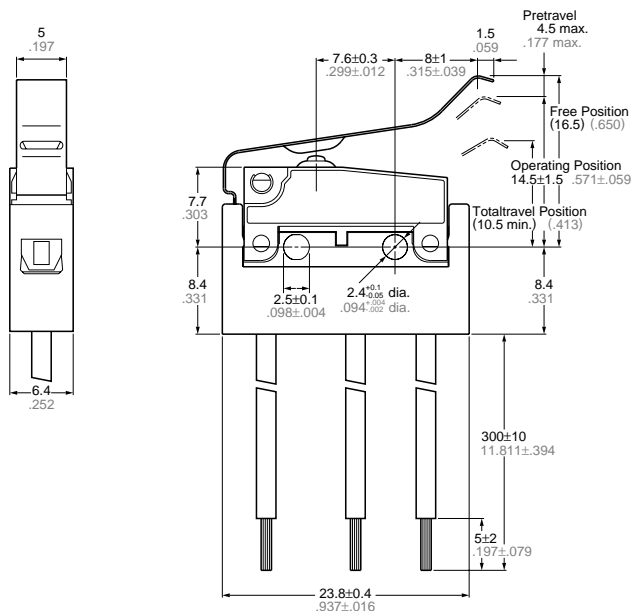
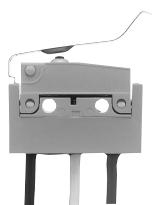
Right angle type



Left angle type



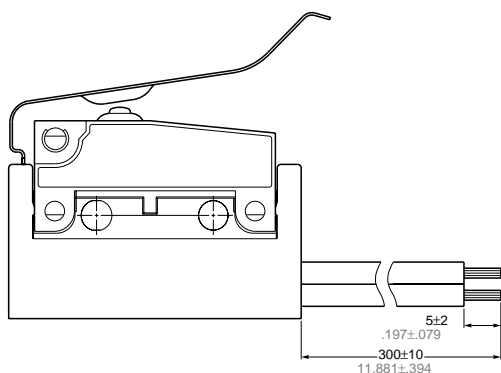
## Leaf lever Straight type



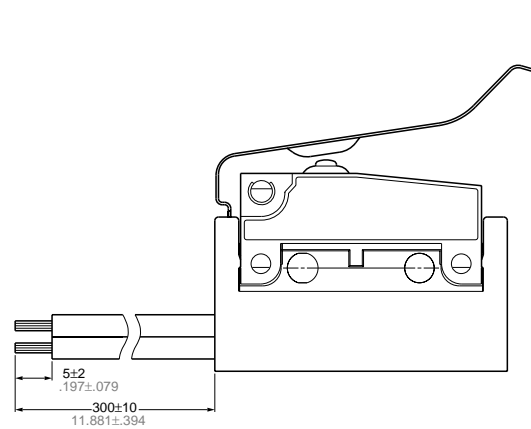
Thickness of the lead wire: 0.5 mm<sup>2</sup>  
 UL/CSA approved type and Right/Left angle type:  
 AWG #20  
 Color of the lead wire:  
 COM ...Black  
 N.C. ...Red  
 N.O. ...White

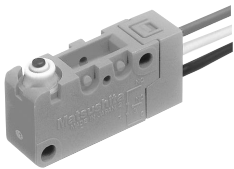
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## Right angle type



## Left angle type





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## FEATURES

- Miniature size (33×15.9×10.3 mm) (1.299×.626×.406 inch)
- Sealed construction for use in adverse environment—Sealed construction by epoxy resin and rubber cap keeps off the cause of miscontact such as dust Conforming to IP67\* of IEC protective construction classification
- Elastomer double molding technology, an industry first and ultrasonic swaging technology contribute to uniform seling in high production quantities
- UL/CSA/VDE/SEMKO approved

\*Based on the protective construction classification of IED, items which satisfy the test requirements are denoted with an IP designation.

## TYPICAL APPLICATIONS

- Automotives
- Agricultural devices
- Industrial equipment

## ORDERING INFORMATION

Ex. ABV1 2 1 0 6 1

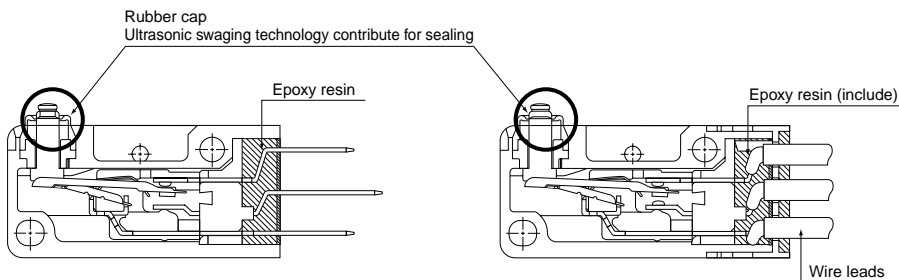
Type of switch	Terminal	Contact arrangement	Actuator	Operating force by pin plunger (max.)	Contact
ABV1: Turquoise switch V type	2: .187 quick-connect terminal 6: Wire leads	1: SPDT 2: SPST-NC 3: SPST-NO	0: Pin plunger 2: Hinge lever 4: Simulated roller lever 5: Short roller lever 6: Roller lever	4: 0.98 N {100 gf} 5: 1.96 N {200 gf} 6: 2.94 N {300 gf}	1: Gold-clad 0: Silver-alloy

Remarks: 1. Standard packing: Dust protected type 50 pcs./carton, 500 pcs./case; Immersion protected type 50 pcs./case.  
2. Not every combination is available. Please refer to the following table, "PRODUCT TYPES".

## CONSTRUCTION

.187 quick-connect terminal

Wire leads



**PRODUCT TYPES**

**Silver-alloy**

Contact	Actuator	Contact Arrangement	Operating force, Max.	187 Quick-connect terminal	Wire Leads
Silver-alloy	Pin plunger	SPDT	0.98 N {100 gf}	ABV121040	ABV161040
			1.96 N {200 gf}	ABV121050	ABV161050
			2.94 N {300 gf}	ABV121060	ABV161060
		SPST-NC	0.98 N {100 gf}	ABV122040	ABV162040
			1.96 N {200 gf}	ABV122050	ABV162050
			2.94 N {300 gf}	ABV122060	ABV162060
		SPST-NO	0.98 N {100 gf}	ABV123040	ABV163040
			1.96 N {200 gf}	ABV123050	ABV163050
			2.94 N {300 gf}	ABV123060	ABV163060
	Hinge lever	SPDT	0.59 N {60 gf}	ABV121240	ABV161240
			1.18 N {120 gf}	ABV121250	ABV161250
			1.77 N {180 gf}	ABV121260	ABV161260
		SPST-NC	0.59 N {60 gf}	ABV122240	ABV162240
			1.18 N {120 gf}	ABV122250	ABV162250
			1.77 N {180 gf}	ABV122260	ABV162260
		SPST-NO	0.59 N {60 gf}	ABV123240	ABV163240
			1.18 N {120 gf}	ABV123250	ABV163250
			1.77 N {180 gf}	ABV123260	ABV163260
	Simulated roller lever	SPDT	0.59 N {60 gf}	ABV121440	ABV161440
			1.18 N {120 gf}	ABV121450	ABV161450
			1.77 N {180 gf}	ABV121460	ABV161460
		SPST-NC	0.59 N {60 gf}	ABV122440	ABV162440
			1.18 N {120 gf}	ABV122450	ABV162450
			1.77 N {180 gf}	ABV122460	ABV162460
		SPST-NO	0.59 N {60 gf}	ABV123440	ABV163440
			1.18 N {120 gf}	ABV123450	ABV163450
			1.77 N {180 gf}	ABV123460	ABV163460
	Short roller lever	SPDT	1.08 N {110 gf}	ABV121540	ABV161540
			2.16 N {220 gf}	ABV121550	ABV161550
			3.14 N {320 gf}	ABV121560	ABV161560
		SPST-NC	1.08 N {110 gf}	ABV122540	ABV162540
			2.16 N {220 gf}	ABV122550	ABV162550
			3.14 N {320 gf}	ABV122560	ABV162560
		SPST-NO	1.08 N {110 gf}	ABV123540	ABV163540
			2.16 N {220 gf}	ABV123550	ABV163550
			3.14 N {320 gf}	ABV123560	ABV163560
Roller lever	SPDT	0.59 N {60 gf}	ABV121640	ABV161640	
		1.18 N {120 gf}	ABV121650	ABV161650	
		1.77 N {180 gf}	ABV121660	ABV161660	
	SPST-NC	0.59 N {60 gf}	ABV122640	ABV162640	
		1.18 N {120 gf}	ABV122650	ABV162650	
		1.77 N {180 gf}	ABV122660	ABV162660	
	SPST-NO	0.59 N {60 gf}	ABV123640	ABV163640	
		1.18 N {120 gf}	ABV123650	ABV163650	
		1.77 N {180 gf}	ABV136660	ABV163660	

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
 When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.

# ABV1

## Gold-clad

Contact	Actuator	Contact Arrangement	Operating force, Max.	187 Quick-connect terminal	Wire Leads
Gold-clad	Pin plunger	SPDT	0.98 N {100 gf}	ABV121041	ABV161041
			1.96 N {200 gf}	ABV121051	ABV161051
			2.94 N {300 gf}	ABV121061	ABV161061
		SPST-NC	0.98 N {100 gf}	ABV122041	ABV162041
			1.96 N {200 gf}	ABV122051	ABV162051
			2.94 N {300 gf}	ABV122061	ABV162061
		SPST-NO	0.98 N {100 gf}	ABV123041	ABV163041
			1.96 N {200 gf}	ABV123051	ABV163051
			2.94 N {300 gf}	ABV123061	ABV163061
	Hinge lever	SPDT	0.59 N {60 gf}	ABV121241	ABV161241
			1.18 N {120 gf}	ABV121251	ABV161251
			1.77 N {180 gf}	ABV121261	ABV161261
		SPST-NC	0.59 N {60 gf}	ABV122241	ABV162241
			1.18 N {120 gf}	ABV122251	ABV162251
			1.77 N {180 gf}	ABV122261	ABV162261
		SPST-NO	0.59 N {60 gf}	ABV123241	ABV163241
			1.18 N {120 gf}	ABV123251	ABV163251
			1.77 N {180 gf}	ABV123261	ABV163261
	Simulated roller lever	SPDT	0.59 N {60 gf}	ABV121441	ABV161441
			1.18 N {120 gf}	ABV121451	ABV161451
			1.77 N {180 gf}	ABV121461	ABV161461
		SPST-NC	0.59 N {60 gf}	ABV122441	ABV162441
			1.18 N {120 gf}	ABV122451	ABV162451
			1.77 N {180 gf}	ABV122461	ABV162461
		SPST-NO	0.59 N {60 gf}	ABV123441	ABV163441
			1.18 N {120 gf}	ABV123451	ABV163451
			1.77 N {180 gf}	ABV123461	ABV163461
	Short roller lever	SPDT	1.08 N {110 gf}	ABV121541	ABV161541
			2.16 N {220 gf}	ABV121551	ABV161551
			3.14 N {320 gf}	ABV121561	ABV161561
		SPST-NC	1.08 N {110 gf}	ABV122541	ABV162541
			2.16 N {220 gf}	ABV122551	ABV162551
			3.14 N {320 gf}	ABV122561	ABV162561
		SPST-NO	1.08 N {110 gf}	ABV123541	ABV163541
			2.16 N {220 gf}	ABV123551	ABV163551
			3.14 N {320 gf}	ABV123561	ABV163561
	Roller lever	SPDT	0.59 N {60 gf}	ABV121641	ABV161641
			1.18 N {120 gf}	ABV121651	ABV161651
			1.77 N {180 gf}	ABV121661	ABV161661
		SPST-NC	0.59 N {60 gf}	ABV122641	ABV162641
			1.18 N {120 gf}	ABV122651	ABV162651
			1.77 N {180 gf}	ABV122661	ABV162661
SPST-NO		0.59 N {60 gf}	ABV123641	ABV163641	
		1.18 N {120 gf}	ABV123651	ABV163651	
		1.77 N {180 gf}	ABV136661	ABV163661	

Remarks: When ordering UL/CSA approved types, please attach suffix "9" to the part number.  
 When ordering VDE/SEMKO approved types, please attach suffix "8" to the part number.



# SPECIFICATIONS

## 1. Contact rating

Type	Standard rating	Low-level rating
Gold-clad contact	3 A 250 V AC (O.F. 1.96 N {200gf}, 2.94 N {300gf}) 1 A 250 V AC (O.F. 0.98 N {100gf})	5 mA 6 V DC 2 mA 12 V DC 1 mA 24 V DC
Silver-alloy	5 A 250 V AC (O.F. 1.96 N {200gf}, 2.94 N {300gf}) 3 A 250 V AC (O.F. 0.98 N {100gf})	—

## 2. Characteristics

Mechanical life (O.T.: Specified value)	Min. 5x10 <sup>6</sup> (at 60 cpm)	
Electrical life	Nominal rating (O.T.: Max.)	Min. 10 <sup>5</sup> (at 20 cpm)
	Low-level rating (O.T.: Specified value)	Min. 10 <sup>6</sup> (at 20 cpm)
Insulation resistance	Min. 100 MΩ (at 500 V DC insulation resistance meter)	
Dielectric strength	1,000 Vrms	
Between non-continuous terminals	2,000 Vrms	
Between each terminal and other exposed metal parts	2,000 Vrms	
Between each terminal and ground	2,000 Vrms	
Vibration resistance	10 to 55 Hz at single amplitude of 0.75 mm (Contact opening: max. 1 msec.)	
Shock resistance	Min. 294 m/s <sup>2</sup> {30 G} (Contact opening: Max. 1 msec.)	
Contact resistance	Silver alloy contact type	Dust protected type (IP50): Max. 50 mΩ Immersion protected type (IP67): Max. 100 mΩ (By voltage drop 1 A 6 to 8 V DC)
	Gold-clad contact type	Dust protected type (IP50): Max. 50 mΩ Immersion protected type (IP67): Max. 100 mΩ (By voltage drop 0.1 A 6 to 8 V DC)
Allowable operating speed (at no load)	1 to 500 mm/sec.	
Ambient temperature (at no load)	-40°C to +85°C -40°F to +185°F	
Unit weight	Approx. 7 g .247 oz (IP50 type)	

## 3. Operating characteristics

Type of actuator	Operating force, Max.			Release force, Min.			Pretravel, Max. mm inch	Movement differential, Max. mm inch	Overtravel, Min. mm inch	Operating position, mm inch
	2.94N {300gf}	1.96N {200gf}	0.98N {100gf}	0.59N {60gf}	0.39N {40gf}	0.25N {25gf}				
Pin plunger	2.94N {300gf}	1.96N {200gf}	0.98N {100gf}	0.59N {60gf}	0.39N {40gf}	0.25N {25gf}	1.6 .063	0.4 .016	0.8 .031	14.7±0.6 .579 ± .024
Hinge lever	1.77N {180gf}	1.18N {120gf}	0.59N {60gf}	0.20N {20gf}	0.13N {13gf}	0.098N {10gf}	3.2 .126	1.2 .047	1.2 .047	15.3±1.2 .602 ± .047
Simulated roller lever	1.77N {180gf}	1.18N {120gf}	0.59N {60gf}	0.20N {20gf}	0.13N {13gf}	0.098N {10gf}	3.2 .126	1.2 .047	1.2 .047	18.5±1.2 .728 ± .047
Short roller lever	3.14N {320gf}	2.16N {220gf}	1.08N {110gf}	0.59N {60gf}	0.39N {40gf}	0.20N {20gf}	1.6 .063	0.5 .020	0.8 .031	20.7±0.8 .815 ± .031
Roller lever	1.77N {180gf}	1.18N {120gf}	0.59N {60gf}	0.20N {20gf}	0.13N {13gf}	0.098N {10gf}	3.2 .126	1.2 .047	1.2 .047	20.7±1.2 .815 ± .047

( ) : Low force type

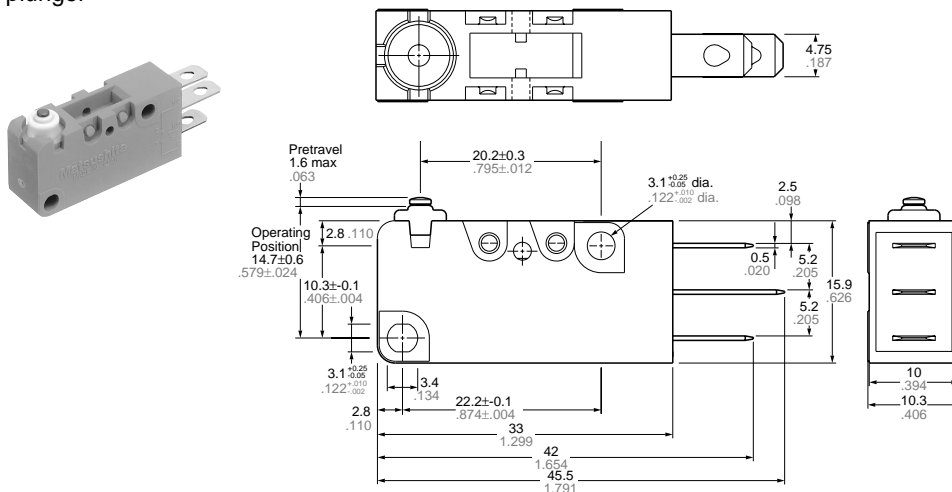
# DIMENSIONS

mm inch General tolerance: ±0.4 ± .016

## 1. Dust protected type

1-(1) .187 quick-connect terminal

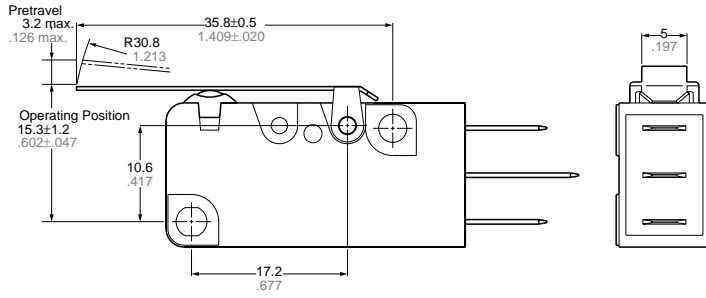
Pin plunger



Pretravel, Max. mm inch	1.6 .063
Movement differential, Max. mm inch	0.4 .016
Overtravel, Min. mm inch	0.8 .031
Operating position, mm inch	14.7±0.6 .579 ± .024

# ABV1

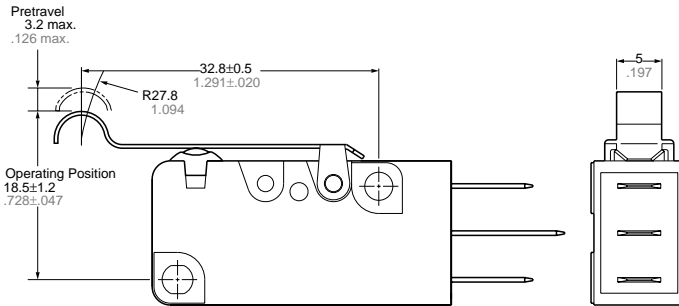
## Hinge lever



mm inch General tolerance: ±0.25 ± .010

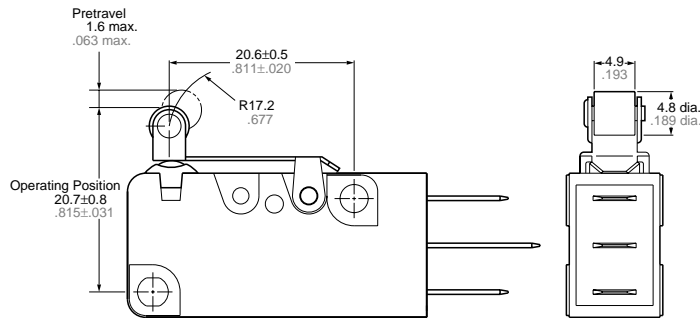
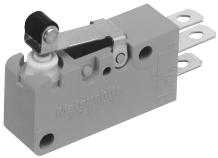
Pretravel, Max. mm inch	3.2 .126
Movement differential, Max. mm inch	1.2 .047
Overtravel, Min. mm inch	1.2 .047
Operating position, mm inch	15.3±1.2 .602 ± .047

## Simulated roller lever



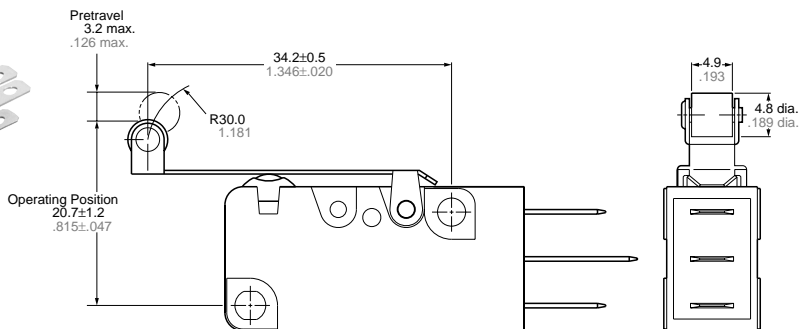
Pretravel, Max. mm inch	3.2 .126
Movement differential, Max. mm inch	1.2 .047
Overtravel, Min. mm inch	1.2 .047
Operating position, mm inch	18.5±1.2 .728 ± .047

## Short roller lever



Pretravel, Max. mm inch	1.6 .063
Movement differential, Max. mm (inch)	0.5 .020
Overtravel, Min. mm (inch)	0.8 .031
Operating position, mm inch	20.7±0.8 .815 ± .031

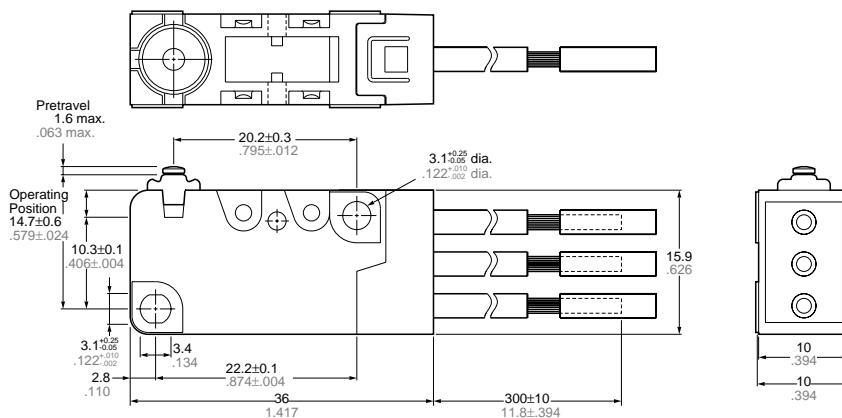
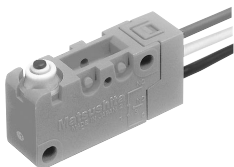
## Roller lever



Pretravel, Max. mm inch	3.2 .126
Movement differential, Max. mm inch	1.2 .047
Overtravel, Min. mm (inch)	1.2 .047
Operating position, mm inch	20.7±1.2 .815 ± .047

## 2. Immersion protected type

### Wire Leads

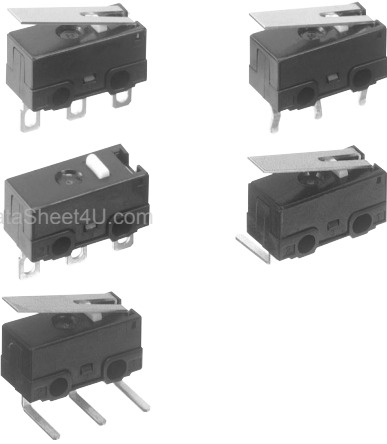


Thickness of the lead wire:  
 Standard type: 0.75mm<sup>2</sup>  
 UL/CSA approved type:  
 AWG #18  
 Color of the lead wire  
 COM ...black  
 N.C. ...red  
 N.O. ...white

# NAiS

## ULTRA-MINIATURE SWITCHES WITH HIGH PRECISION

# FJ (AH1) SWITCHES



### FEATURES

- Integrally molded terminal block—prevents soldering flux from entering into housing
- Compact size —minimizes size of equipment
- Flat terminal shape—makes soldering works easy
- Low-level circuit type available
- Self-standing PC board terminal type available

### TYPICAL APPLICATIONS

- Mouse
- Charger unit for mobile phone
- Detection of key position for automobiles

## ORDERING INFORMATION

Ex. AH 1 4 8 0 61  

Product Name	Terminal	Operating force by pin plunger (max.)	Actuator	Contact	Contact arrangement
FJ	4: 2.0 mm Self-standing PC board terminal with stand off 6: 2.0 mm solder terminal with stand off 7: 2.0 mm PC board right angle terminal 8: 2.0 mm PC board left angle terminal	6: 1.47 N {150 gf} with stand off 8: 0.74 N {75 gf} with stand off	0: Pin plunger 2: Hinge lever 4: Simulated roller lever	Nil: Silver alloy 61: Gold-clad	Nil: SPDT A: SPST-NO

Remark: 2.0 mm PC board terminal straight type is available. For details, please consult us.

## PRODUCT TYPES

The color of:

Type	Color		
	Body	Cap	Plunger
Standard	Black	Black	White
Low-level circuit	Black	Black	Red

### 1. Self-standing PC board terminal

Actuators	Operating force, Max.	Standard (Silver alloy contact)		Low-level circuit (Gold-clad contact)
		SPDT	SPST-NO	SPDT
Pin plunger	0.74 N {75 gf}	AH1480	AH1480A	AH148061
	1.47 N {150gf}	AH1460	AH1460A	AH146061
Hinge lever	0.25 N {25gf}	AH1482	AH1482A	AH148261
	0.49 N {50gf}	AH1462	AH1462A	AH146261
Simulated roller lever	0.26 N {27gf}	AH1484	AH1484A	AH148461
	0.54 N {55gf}	AH1464	AH1464A	AH146461

### 2. Solder terminal

Actuators	Operating force, Max.	Standard (Silver alloy contact)		Low-level circuit (Gold-clad contact)
		SPDT	SPST-NO	SPDT
Pin plunger	0.74 N {75 gf}	AH1680	AH1680A	AH168061
	1.47 N {150gf}	AH1660	AH1660A	AH166061
Hinge lever	0.25 N {25gf}	AH1682	AH1682A	AH168261
	0.49 N {50gf}	AH1662	AH1662A	AH166261
Simulated roller lever	0.26 N {27gf}	AH1684	AH1684A	AH168461
	0.54 N {55gf}	AH1664	AH1664A	AH166461

### 3. PC board terminal right angle

Actuators	Operating force, Max.	Standard (Silver alloy contact)	Low-level circuit (Gold-clad contact)
		SPDT	SPDT
Pin plunger	0.74 N {75 gf}	AH1780	AH178061
Pin plunger	1.47 N {150gf}	AH1760	AH176061
Hinge lever	0.25 N {25gf}	AH1782	AH178261
Hinge lever	0.49 N {50gf}	AH1762	AH176261
Simulated roller lever	0.26 N {27gf}	AH1784	AH178461
Simulated roller lever	0.54 N {55gf}	AH1764	AH176461

### 4. PC board terminal left angle

Actuators	Operating force, Max.	Standard (Silver alloy contact)	Low-level circuit (Gold-clad contact)
		SPDT	SPDT
Pin plunger	0.74 N {75 gf}	AH1880	AH188061
	1.47 N {150gf}	AH1860	AH186061
Hinge lever	0.25 N {25gf}	AH1882	AH188261
	0.49 N {50gf}	AH1862	AH186261
Simulated roller lever	0.26 N {27gf}	AH1884	AH188461
	0.54 N {55gf}	AH1864	AH186461

Remarks: 1. The appearance of right and left angle types are as below.

Right angle



Left angle



- When ordering UL/CSA approved types, please attach suffix "9" to the part number.
- Standard packing: 50 pcs./tube.
- Please consult us for the delivery schedule of PC board terminal SPST-NO type.

## APPLICABLE CURRENT RANGE

Contact	Applicable current range				Max. operating force for operation (at pin plunger)	
	1 mA	0.1 A	1 A	3 A	0.74 N {75 gf}	1.47 N {150 gf}
Standard type (Silver alloy)			●		●	
			●			●
Low level circuit type (Gold-clad)	●				●	
	●					●

## SPECIFICATIONS

### 1. Contact rating (resistive load)

		Standard rating	Low-level rating
Standard type	O.F. 75g 2.65oz	1A 125V AC, 1A 30V DC	—
	O.F. 150g 5.29oz	3A 125V AC, 2A 30V DC	—
Low-level circuit type		0.1A 125V AC, 0.1A 30V DC	5mA 6V DC, 2mA 12V DC, 1mA 24V DC

### 2. Characteristics

Contact arrangement	Standard type	Low-level circuit type
Expected life (Min. operations) Electrical (at rated load, 20 cpm) (O.T.: Max.)	$3 \times 10^4$	$10^5$
Expected life (Min. operations) Mechanical (at 60 cpm) (O.T.: Specified value)	O.F. 0.74 N {75 gf}: $10^6$ O.F. 1.47 N {150 gf}: $5 \times 10^5$	
Dielectric strength (initial) Between terminals Between terminals and other exposed parts Between terminals and ground	600 Vrms for 1 min. 1,500 Vrms for 1 min. 1,500 Vrms for 1 min.	
Insulation resistance (Min. at 500V DC)	100 M $\Omega$	
Initial contact resistance	Max. 30 m $\Omega$ (by voltage drop, 1A 6 to 8V DC)	Max. 100 m $\Omega$ (by voltage drop, 0.1A 6 to 8V DC)
Allowable operating speed (No load)	1 to 500 mm/sec.	
Max. operating cycle rate (No load)	120 cpm	
Ambient temperature	-25 to +85°C -13 to +185°F (Not freezing below 0°C 32°F)	
Ambient humidity	Max. 85% R.H.	
Shock resistance (Pin plunger type)	Min. 294 m/s <sup>2</sup> {30G} (Contact opening: Max. 1 msec.)	
Vibration resistance (Pin plunger type)	10 to 55 Hz at single amplitude of 0.75mm (Contact opening: Max. 1 msec.)	

# AH1

## 3. Operating characteristics

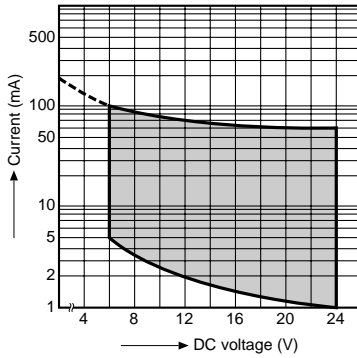
Type of actuator	Operating force, Max.		Release force, Min.		Pretravel, Max. mm inch	Movement differential, Max. mm inch	Overtravel, Min. mm inch	Operating position mm inch	
	5th digit of Part No.		5th digit of Part No.					5th digit of Part No.	6,8
	6	8	6	8			6, 8	Distance from stand off	Distance from mounting hole
Pin plunger	1.47 N {150 gf}	0.74 N {75 gf}	0.20 N {20 gf}	0.098 N {10 gf}	0.5 .020	0.12 .005	0.25 .010	7±0.3 .276±.012	5.5±0.2 .217±.008
Hinge lever	0.49 N {50 gf}	0.25 N {25 gf}	0.049 N {5 gf}	0.025 N {2.5 gf}	2.1 .083	0.5 .020	0.55 .022	8.3±1.2 .327±.047	6.8±1.0 .268±.039
Simulated roller lever	0.54 N {55 gf}	0.26 N {27 gf}	0.039 N {4 gf}	0.020 N {2 gf}	2.1 .083	0.5 .020	0.5 .020	11.0±1.2 .433±.047	9.5±1.0 .374±.039

## DATA

### Gold-clad type

Range of low-level current voltage

www.DataSheet4U.com

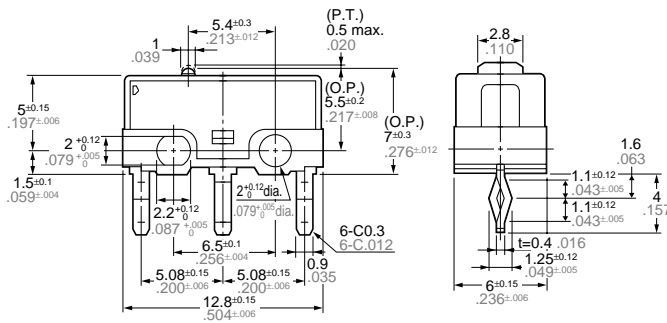


## DIMENSIONS

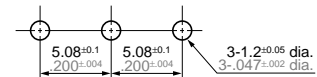
mm inch

### 1. Self-standing PC board terminal (Standard type)

Pin plunger

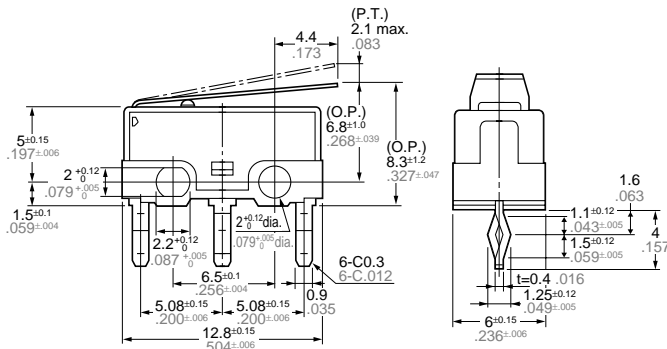


PC board pattern

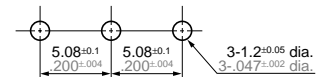


Pretravel, Max. mm inch		0.5 .020
Movement differential, Max. mm inch		0.12 .005
Overtravel, Min. mm inch		0.25 .010
Operating position	Distance from mounting hole, mm inch	5.5±0.2 .217±.008
	Distance from standoff, mm inch	7±0.3 .276±.012

Hinge lever

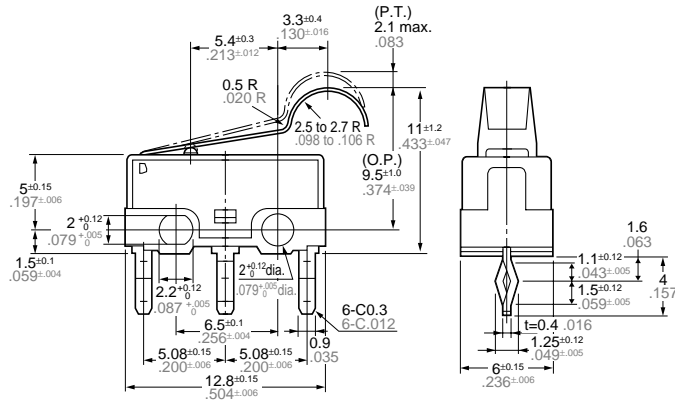


PC board pattern

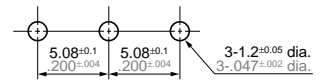


Pretravel, Max. mm inch		2.1 .083
Movement differential, Max. mm inch		0.5 .020
Overtravel, Min. mm inch		0.5 .020
Operating position	Distance from mounting hole, mm inch	9.5±1.0 .374±.039
	Distance from standoff, mm inch	11.0±1.2 .433±.047

## Simulated roller lever

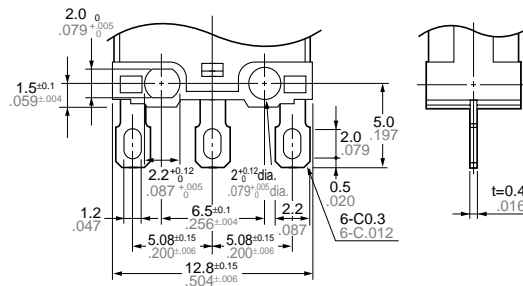


### PC board pattern



Pretravel, Max. mm inch	2.1 .083	
Movement differential, Max. mm inch	0.5 .020	
Overtravel, Min. mm inch	0.5 .020	
Operating position	Distance from mounting hole, mm inch	9.5±1.0 .374±0.039
	Distance from standoff, mm inch	11.0±1.2 .433±0.047

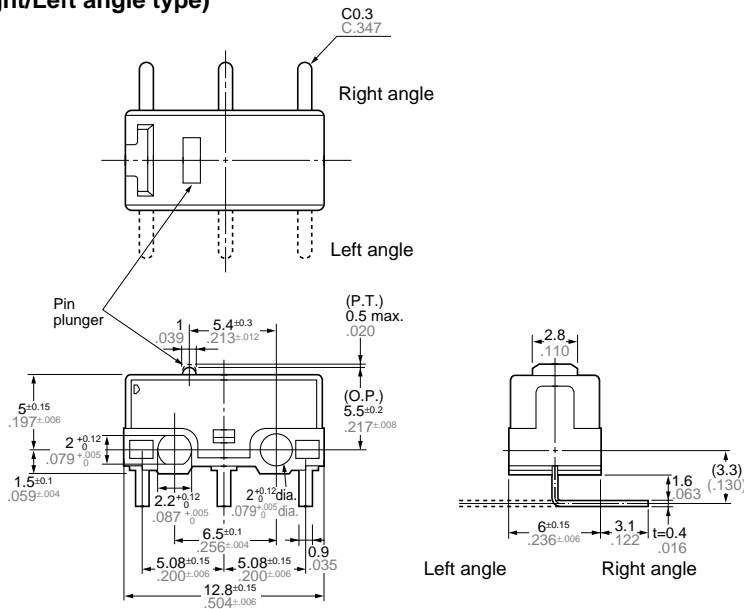
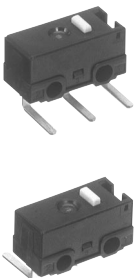
## 2. Solder terminal Pin plunger



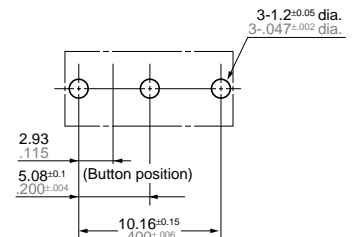
Remark: As for other actuator types, dimensions are the same as those of corresponding standard PC board terminal type.

## 3. PC board terminal (Right/Left angle type) Pin plunger

Pin plunger



### Recommended PC board pattern (top view)



Remark: As for other actuator types, dimensions are the same as those of corresponding standard PC board terminal type.

## NOTES

### 1. Fixing

- Use 2mm mounting screws to attach switches with Max. 1.0 kg-cm torque. Use of screw washers or adhesiove lock is recommended.
- When the operation object is in the free position, force should not be applied directly to the actuator or to the pin plunger. Also force should be applied to the pin plunger from vertical direction to the switch.

- In setting the movement after operation, the over-travel should be set from 70% to 100%. Setting the movement less than 70% may cause degrading the electrical mechanical performance.

### 2. When specifying FJ switches, allow ±20% to the listed operating and release forces.

### 3. Soldering operation

- For manual soldering: 18 W soldering iron, soldering completed within 3 sec-

- onds; do not apply force to the terminals.
- For automatic soldering tank: 260°C +500°F immersion, completed within 5 seconds, 350°C +662°F immersion, completed within 3 seconds.

### 4. When switching low-level circuits, FJ low-level circuit type is recommended.

# NAIS

## HIGH PERFORMANCE MINIATURE SWITCHES WITH WIDE RANGE

# NV (AH7) SWITCHES



### FEATURES

- Extra long-life spring mechanism  
—More than 10<sup>7</sup> mechanical operations,  
10<sup>5</sup> electrical
- High contact rating of 15 Amps with  
an operating force of only 200 g 7.05 oz
- Safety insulation guard types avail-  
able
- Available in a wide operating force  
and capacity range
- UL/CSA/VDE/SEMKO approved

### TYPICAL APPLICATIONS

- Home appliances
- Vending machines
- Amusement and communication  
equipment
- Copiers
- General industrial machines

## ORDERING INFORMATION

Ex. AH7

Type of switch	Contact arrangement	Terminal	Actuators	Operating force by pin plunger (max.)						
				Type	0.15N {15gf}	0.25N {25gf}	0.49N {50gf}	0.98N {100gf}	1.96N {200gf}	3.92N {400gf}
NV switch	1: Bottom COM terminal SPDT 2: Bottom COM terminal SPST-NC 3: Bottom COM terminal SPST-NO 4: Side COM terminal SPDT 5: Side COM terminal SPST-NC 6: Side COM terminal SPST-NO	*(1: Solder terminal with right-hand guard) *(2: Solder terminal without guard) 4: .187 Quick-connect/solder terminal with right-hand guard 5: .187 Quick-connect/solder terminal without guard *(8: .250 Quick-connect terminal)	0: Pin plunger 1: Short hinge lever 2: Hinge lever 3: Long hinge lever 4: Simulated roller lever 5: Short roller lever 6: Roller lever 8: Wire lever	Standard type	—	—	360	460	5	7
				Heat resistant type	—	—	356	456	555	755
				Standard	—	—	*(355)	*(455)		
				Low-level circuit type (Standard)	—	—	361	461	561	—
				Heat resistant type (Low-level circuit type)	162	262	362	462	562	—

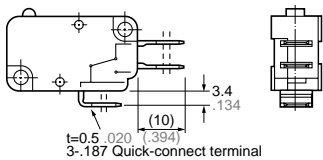
Remark: Please consult us for \* marked product.

## TERMINALS

mm inch

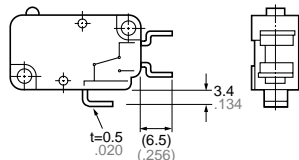
### 1. .187 Quick-connect/solder terminal

1) Bottom COM terminal



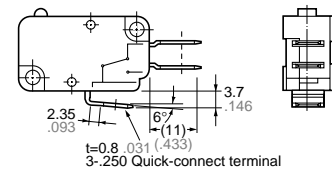
### 2. Solder terminal

1) Bottom COM terminal

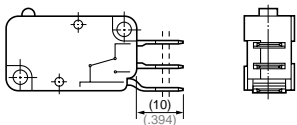


### 3. .250 Quick-connect terminal

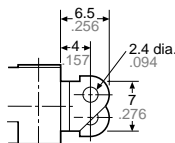
1) Bottom COM terminal



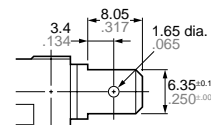
2) Side COM terminal



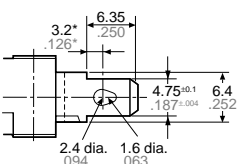
2) Terminal portion dimensions



2) Terminal portion dimensions



3) Terminal portion dimensions



\* Indicating for the center of 1.6 dia. .063 dia.

## PRODUCT TYPES

### 1. Standard type

Bottom COM terminal .187 Quick-connect/solder terminal without guard

Actuators	Operating force, max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	0.49N{50gf}	AH7150360	AH7250360	AH7350360
	0.98N{100gf}	AH7150460	AH7250460	AH7350460
	1.96N{200gf}	AH71505	AH72505	AH73505
	3.92N{400gf}	AH71507	AH72507	AH73507
Short hinge lever	0.49N{50gf}	AH7151360	AH7251360	AH7351360
	0.98N{100gf}	AH7151460	AH7251460	AH7351460
	1.96N{200gf}	AH71515	AH72515	AH73515
	3.92N{400gf}	AH71517	AH72517	AH73517
Hinge lever	0.49N{50gf}	AH7152360	AH7252360	AH7352360
	0.98N{100gf}	AH7152460	AH7252460	AH7352460
	1.96N{200gf}	AH71525	AH72525	AH73525
	3.92N{400gf}	AH71527	AH72527	AH73527
Long hinge lever	0.49N{50gf}	AH7153360	AH7253360	AH7353360
	0.98N{100gf}	AH7153460	AH7253460	AH7353460
	1.96N{200gf}	AH71535	AH72535	AH73535
	3.92N{400gf}	AH71537	AH72537	AH73537
Simulated roller lever	0.49N{50gf}	AH7154360	AH7254360	AH7354360
	0.98N{100gf}	AH7154460	AH7254460	AH7354460
	1.96N{200gf}	AH71545	AH72545	AH73545
	3.92N{400gf}	AH71547	AH72547	AH73547
Short roller lever	0.49N{50gf}	AH7155360	AH7255360	AH7355360
	0.98N{100gf}	AH7155460	AH7255460	AH7355460
	1.96N{200gf}	AH71555	AH72555	AH73555
	3.92N{400gf}	AH71557	AH72557	AH73557
Roller lever	0.49N{50gf}	AH7156360	AH7256360	AH7356360
	0.98N{100gf}	AH7156460	AH7256460	AH7356460
	1.96N{200gf}	AH71565	AH72565	AH73565
	3.92N{400gf}	AH71567	AH72567	AH73567

Remarks: 1. When ordering solder terminal, change the fifth digit of part number from "5" to "2" and delete suffix "60" from the part no.  
 2. When ordering 2.94N{300gf} types, insert the number "6" at the seventh digit of part no. instead of "360", "460", "5" or "7".  
 3. When ordering international standard approved types, please attach the following number to the part no.  
 9: UL/CSA 6×10<sup>3</sup> rated  
 4: UL/CSA 10<sup>5</sup> rated  
 8: VDE/SEMKO  
 7: UL TV rating



# AH7

Side COM terminal .187 Quick-connect/solder terminal with right-hand guard

Actuators	Operating force, max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	0.49N{50gf}	AH7440360	AH7540360	AH7640360
	0.98N{100gf}	AH7440460	AH7540460	AH7640460
	1.96N{200gf}	AH74405	AH75405	AH76405
	3.92N{400gf}	AH74407	AH75407	AH76407
Short hinge lever	0.49N{50gf}	AH7441360	AH7541360	AH7641360
	0.98N{100gf}	AH7441460	AH7541460	AH7641460
	1.96N{200gf}	AH74415	AH75415	AH76415
	3.92N{400gf}	AH74417	AH75417	AH76417
Hinge lever	0.49N{50gf}	AH7442360	AH7542360	AH7642360
	0.98N{100gf}	AH7442460	AH7542460	AH7642460
	1.96N{200gf}	AH74425	AH75425	AH76425
	3.92N{400gf}	AH74427	AH75427	AH76427
Long hinge lever	0.49N{50gf}	AH7443360	AH7543360	AH7643360
	0.98N{100gf}	AH7443460	AH7543460	AH7643460
	1.96N{200gf}	AH74435	AH75435	AH76435
	3.92N{400gf}	AH74437	AH75437	AH76437
Simulated roller lever	0.49N{50gf}	AH7444360	AH7544360	AH7644360
	0.98N{100gf}	AH7444460	AH7544460	AH7644460
	1.96N{200gf}	AH74445	AH75445	AH76445
	3.92N{400gf}	AH74447	AH75447	AH76447
Short roller lever	0.49N{50gf}	AH7445360	AH7545360	AH7645360
	0.98N{100gf}	AH7445460	AH7545460	AH7645460
	1.96N{200gf}	AH74455	AH75455	AH76455
	3.92N{400gf}	AH74457	AH75457	AH76457
Roller lever	0.49N{50gf}	AH7446360	AH7546360	AH7646360
	0.98N{100gf}	AH7446460	AH7546460	AH7646460
	1.96N{200gf}	AH74465	AH75465	AH76465
	3.92N{400gf}	AH74467	AH75467	AH76467

Remarks: 1. When ordering 2.94N{300gf} types, insert the number "6" at the seventh digit of part no.

2. When ordering international standard approved types, please attach the following number to the part no.

9: UL/CSA 6x10<sup>3</sup> rated

4: UL/CSA 10<sup>5</sup> rated

8: VDE/SEMKO (Not every part no. are approved. Please consult us.)

7: UL TV rating

## Side COM terminal .187 Quick-connect/solder terminal without guard

Actuators	Operating force, max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	0.49N{50gf}	AH7450360	AH7550360	AH7650360
	0.98N{100gf}	AH7450460	AH7550460	AH7650460
	1.96N{200gf}	AH74505	AH75505	AH76505
	3.92N{400gf}	AH74507	AH75507	AH76507
Short hinge lever	0.49N{50gf}	AH7451360	AH7551360	AH7651360
	0.98N{100gf}	AH7451460	AH7551460	AH7651460
	1.96N{200gf}	AH74515	AH75515	AH76515
	3.92N{400gf}	AH74517	AH75517	AH76517
Hinge lever	0.49N{50gf}	AH7452360	AH7552360	AH7652360
	0.98N{100gf}	AH7452460	AH7552460	AH7652460
	1.96N{200gf}	AH74525	AH75525	AH76525
	3.92N{400gf}	AH74527	AH75527	AH76527
Long hinge lever	0.49N{50gf}	AH7453360	AH7553360	AH7653360
	0.98N{100gf}	AH7453460	AH7553460	AH7653460
	1.96N{200gf}	AH74535	AH75535	AH76535
	3.92N{400gf}	AH74537	AH75537	AH76537
Simulated roller lever	0.49N{50gf}	AH7454360	AH7554360	AH7654360
	0.98N{100gf}	AH7454460	AH7554460	AH7654460
	1.96N{200gf}	AH74545	AH75545	AH76545
	3.92N{400gf}	AH74547	AH75547	AH76547
Short roller lever	0.49N{50gf}	AH7455360	AH7555360	AH7655360
	0.98N{100gf}	AH7455460	AH7555460	AH7655460
	1.96N{200gf}	AH74555	AH75555	AH76555
	3.92N{400gf}	AH74557	AH75557	AH76557
Roller lever	0.49N{50gf}	AH7456360	AH7556360	AH7656360
	0.98N{100gf}	AH7456460	AH7556460	AH7656460
	1.96N{200gf}	AH74565	AH75565	AH76565
	3.92N{400gf}	AH74567	AH75567	AH76567

- Remarks: 1. When ordering 2.94N{300gf} types, insert the number "6" at the seventh digit of part no.  
2. When ordering international standard approved types, please attach the following number to the part no.  
9: UL/CSA 6×10<sup>3</sup> rated  
4: UL/CSA 10<sup>5</sup> rated  
8: VDE/SEMKO (Not every part no. are approved. Please consult us.)  
7: UL TV rating

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## 2. Heat resistant type (Standard)

.187 Quick-connect/solder terminal without guard

Actuators	Operating force, max.	Bottom COM terminal	Side COM terminal
Pin plunger	0.49N{50gf}	AH7150356	AH7450356
	0.98N{100gf}	AH7150456	AH7450456
	1.96N{200gf}	AH7150555	AH7450555
	3.92N{400gf}	AH7150755	AH7450755
Short hinge lever	0.59N{60gf}	AH7151356	AH7451356
	1.08N{110gf}	AH7151456	AH7451456
	2.16N{220gf}	AH7151555	AH7451555
	4.12N{420gf}	AH7151755	AH7451755
Hinge lever	0.29N{30gf}	AH7152356	AH7452356
	0.59N{60gf}	AH7152456	AH7452456
	1.18N{120gf}	AH7152555	AH7452555
	2.35N{240gf}	AH7152755	AH7452755
Long hinge lever	0.15N{15gf}	AH7153356	AH7453356
	0.29N{30gf}	AH7153456	AH7453456
	0.59N{60gf}	AH7153555	AH7453555
	1.18N{120gf}	AH7153755	AH7453755
Simulated roller lever	0.29N{30gf}	AH7154356	AH7454356
	0.59N{60gf}	AH7154456	AH7454456
	1.18N{120gf}	AH7154555	AH7454555
	2.35N{240gf}	AH7154755	AH7454755
Short roller lever	0.59N{60gf}	AH7155356	AH7455356
	1.08N{110gf}	AH7155456	AH7455456
	2.16N{220gf}	AH7155555	AH7455555
	4.12N{420gf}	AH7155755	AH7455755
Roller lever	0.29N{30gf}	AH7156356	AH7456356
	0.59N{60gf}	AH7156456	AH7456456
	1.18N{120gf}	AH7156555	AH7456555
	2.35N{240gf}	AH7156755	AH7456755

Remarks: 1. When ordering solder terminal, change the fifth digit of part number from "5" to "2".

(ex.) AH7150555→AH7120555

2. When ordering 2.94N{300gf} types, insert the number "655" at the seventh digit of part no. instead of "356", "456", "555" or "755".

3. Please consult us for NC and NO types.

4. When ordering international standard approved types, please attach the following number to the part no.

9: UL/CSA 6×10<sup>3</sup> rated

8: VDE/SEMKO

7: UL TV rating

## 3. Heat resistant type (Low-level circuit type)

Actuators	Operating force, max.	Bottom COM terminal	Side COM terminal
Pin plunger	0.15N{15gf}	AH7150162	AH7450162
	0.25N{25gf}	AH7150262	AH7450262
	0.49N{50gf}	AH7150362	AH7450362
	0.98N{100gf}	AH7150462	AH7450462
	1.96N{200gf}	AH7150562	AH7450562
Short hinge lever	0.59N{60gf}	AH7151362	AH7451362
	1.08N{110gf}	AH7151462	AH7451462
	2.16N{220gf}	AH7151562	AH7451562
Hinge lever	0.29N{30gf}	AH7152362	AH7452362
	0.59N{60gf}	AH7152462	AH7452462
	1.18N{120gf}	AH7152562	AH7452562
Long hinge lever	0.15N{15gf}	AH7153362	AH7453362
	0.29N{30gf}	AH7153462	AH7453462
	0.59N{60gf}	AH7153562	AH7453562
Simulated roller lever	0.29N{30gf}	AH7154362	AH7454362
	0.59N{60gf}	AH7154462	AH7454462
	1.18N{120gf}	AH7154562	AH7454562
Short roller lever	0.59N{60gf}	AH7155362	AH7455362
	1.08N{110gf}	AH7155462	AH7455462
	2.16N{220gf}	AH7155562	AH7455562
Roller lever	0.29N{30gf}	AH7156362	AH7456362
	0.59N{60gf}	AH7156462	AH7456462
	1.18N{120gf}	AH7156562	AH7456562
Wire lever	0.098N{10gf}	AH7158162	AH7458162
	0.15N{15gf}	AH7158262	AH7458262

Remarks: 1. Please consult us for NC and NO types.

2. As for International standard, please refer to the "Information".

## SPECIFICATIONS

### 1. Contact rating

Contact	Operating force by pin plunger (max.)	Rating (resistive load)
Silver alloy	0.49N {50gf}	5A 250V AC, 0.5A 125V DC
	0.98N {100gf}	10A 250V AC, 0.6A 125V DC
	1.96N, 2.94N, 3.92N {200gf, 300gf, 400gf}	15A 250V AC, 0.6A 125V DC
Gold clad	0.15N {15gf}	1A 250V AC
	0.25 to 1.96N {25 to 200gf}	3A 250V AC

- Gold clad low level circuit type (resistive load)

6V DC 5mA  
12V DC 2mA  
24V DC 1mA

### 2. Characteristics

Contact		Silver alloy			Gold clad				
Operating force by pin plunger (max.)		0.49N {50gf}	0.98N {100gf}	1.96N, 2.94N, 3.92N {200, 300, 400gf}	0.15N {15gf}	0.25N {25gf}	0.49N {50gf}	0.98N {100gf}	1.96N {200gf}
Expected life (min.)	Mechanical (at O.T. rated)	Min. 10 <sup>7</sup> (at 60 cpm)							
	Electrical (at O.T. min.)	Min. 10 <sup>5</sup> (at rated load, 20 cpm)							
Insulation resistance (min.)		Min. 100MΩ (at 500V DC)							
Dielectric strength	Between terminals	1,000V AC for 1min.							
	Between terminals and other exposed metal parts	1,500V AC for 1min.							
	Between terminals and ground	1,500V AC for 1min.							
Contact resistance (Initial)		Max. 50mΩ (by voltage drop at 1A 6 to 8V DC)			Max. 50 mΩ (by voltage drop at 1A 6 to 8V DC)				
Vibration resistance (by pin plunger types)		10 to 55 Hz at amplitude of 0.75mm (Contact opening: max. 1msec.)							
Shock resistance (by pin plunger types) Min.		98m/s <sup>2</sup> {10G}	196m/s <sup>2</sup> {20G}	294m/s <sup>2</sup> {30G}	98m/s <sup>2</sup> {10G}			196m/s <sup>2</sup> {20G}	294m/s <sup>2</sup> {30G}
Allowable operating speed		0.1 to 1,000mm/sec.							
Max. operating cycle rate		600/min.			300/min.		600/min.		
Ambient temperature		-25°C to +80°C -13°F to +176°F (No freezing below 0°C)							
Ambient humidity		Max. 85% R.H.							
Unit weight		8g .28oz							

### 3. Operating characteristics

#### 1) Pin plunger

mm inch

Seventh digit of part number	O.F. max.	R.F. min.	P.T. max.	M.D. max.	O.T. min.	O.P. max.
1	0.15N{15gf}	0.029N{3gf}	1.6 .063	0.8 .031	0.8 .031	14.7±0.6 .579±.024
2	0.25N{25gf}	0.059N{6gf}	1.6 .063	0.8 .031	0.8 .031	14.7±0.6 .579±.024
3	0.49N{50gf}	0.12N{12gf}	1.6 .063	0.4 .016	0.8 .031	14.7±0.6 .579±.024
4	0.98N{100gf}	0.25N{25gf}	1.6 .063	0.4 .016	0.8 .031	14.7±0.6 .579±.024
5	1.96N{200gf}	0.49N{50gf}	1.6 .063	0.4 .016	0.8 .031	14.7±0.6 .579±.024
6	2.94N{300gf}	0.74N{75gf}	1.6 .063	0.4 .016	0.8 .031	14.7±0.6 .579±.024
7	3.92N{400gf}	0.98N{100gf}	1.6 .063	0.4 .016	0.8 .031	14.7±0.6 .579±.024

#### 2) Short hinge lever

Seventh digit of part number	O.F. max.	R.F. min.	P.T. max.	M.D. max.	O.T. min.	O.P. max.
3	0.59N{60gf}	0.098N{10gf}	1.6 .063	0.5 .020	0.8 .031	15.3±0.8 .602±.031
4	1.08N{110gf}	0.20N{20gf}	1.6 .063	0.5 .020	0.8 .031	15.3±0.8 .602±.031
5	2.16N{220gf}	0.39N{40gf}	1.6 .063	0.5 .020	0.8 .031	15.3±0.8 .602±.031
6	3.14N{320gf}	0.59N{60gf}	1.6 .063	0.5 .020	0.8 .031	15.3±0.8 .602±.031
7	4.12N{420gf}	0.78N{80gf}	1.6 .063	0.5 .020	0.8 .031	15.3±0.8 .602±.031

#### 3) Hinge lever

Seventh digit of part number	O.F. max.	R.F. min.	P.T. max.	M.D. max.	O.T. min.	O.P. max.
3	0.29N{30gf}	0.049N{5gf}	3.2 .126	1.2 .047	1.2 .047	15.3±1.2 .602±.047
4	0.59N{60gf}	0.098N{10gf}	3.2 .126	1.2 .047	1.2 .047	15.3±1.2 .602±.047
5	1.18N{120gf}	0.20N{20gf}	3.2 .126	1.2 .047	1.2 .047	15.3±1.2 .602±.047
6	1.77N{180gf}	0.29N{30gf}	3.2 .126	1.2 .047	1.2 .047	15.3±1.2 .602±.047
7	2.35N{240gf}	0.39N{40gf}	3.2 .126	1.2 .047	1.2 .047	15.3±1.2 .602±.047

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## 4) Long hinge lever

Seventh digit of part number	O.F. max.	R.F. min.	P.T. max.	M.D. max.	O.T. min.	O.P. max.
3	0.15N{15gf}	0.025N{2.5gf}	7.5 .295	2.2 .087	2.2 .087	15.3±2.6 .602±.102
4	0.29N{30gf}	0.049N{5gf}	7.5 .295	2.2 .087	2.2 .087	15.3±2.6 .602±.102
5	0.59N{60gf}	0.098N{10gf}	7.5 .295	2.2 .087	2.2 .087	15.3±2.6 .602±.102
6	0.88N{90gf}	0.15N{15gf}	7.5 .295	2.2 .087	2.2 .087	15.3±2.6 .602±.102
7	1.18N{120gf}	0.39N{40gf}	7.5 .295	2.2 .087	2.2 .087	15.3±2.6 .602±.102

## 5) Simulated roller lever

Seventh digit of part number	O.F. max.	R.F. min.	P.T. max.	M.D. max.	O.T. min.	O.P. max.
3	0.29N{30gf}	0.049N{5gf}	3.2 .126	1.2 .047	1.2 .047	18.5±1.2 .728±.047
4	0.59N{60gf}	0.098N{10gf}	3.2 .126	1.2 .047	1.2 .047	18.5±1.2 .728±.047
5	1.18N{120gf}	0.20N{20gf}	3.2 .126	1.2 .047	1.2 .047	18.5±1.2 .728±.047
6	1.77N{180gf}	0.29N{30gf}	3.2 .126	1.2 .047	1.2 .047	18.5±1.2 .728±.047
7	2.35N{240gf}	0.39N{40gf}	3.2 .126	1.2 .047	1.2 .047	18.5±1.2 .728±.047

## 6) Short roller lever

Seventh digit of part number	O.F. max.	R.F. min.	P.T. max.	M.D. max.	O.T. min.	O.P. max.
3	0.59N{60gf}	0.098N{10gf}	1.6 .063	0.5 .020	0.8 .031	20.7±0.8 .815±.031
4	1.08N{110gf}	0.20N{20gf}	1.6 .063	0.5 .020	0.8 .031	20.7±0.8 .815±.031
5	2.16N{220gf}	0.39N{40gf}	1.6 .063	0.5 .020	0.8 .031	20.7±0.8 .815±.031
6	3.14N{320gf}	0.59N{60gf}	1.6 .063	0.5 .020	0.8 .031	20.7±0.8 .815±.031
7	4.12N{420gf}	0.78N{80gf}	1.6 .063	0.5 .020	0.8 .031	20.7±0.8 .815±.031

## 7) Roller lever

Seventh digit of part number	O.F. max.	R.F. min.	P.T. max.	M.D. max.	O.T. min.	O.P. max.
3	0.29N{30gf}	0.049N{5gf}	3.2 .126	1.2 .047	1.2 .047	20.7±1.2 .815±.047
4	0.59N{60gf}	0.098N{10gf}	3.2 .126	1.2 .047	1.2 .047	20.7±1.2 .815±.047
5	1.18N{120gf}	0.20N{20gf}	3.2 .126	1.2 .047	1.2 .047	20.7±1.2 .815±.047
6	1.77N{180gf}	0.29N{30gf}	3.2 .126	1.2 .047	1.2 .047	20.7±1.2 .815±.047
7	2.35N{240gf}	0.39N{40gf}	3.2 .126	1.2 .047	1.2 .047	20.7±1.2 .815±.047

## 8) Wire lever

Seventh digit of part number	O.F. max.	R.F. min.	P.T. max.	M.D. max.	O.T. min.	O.P. max.
1	0.098N{10gf}	0.010N{1gf}	3.5 .138	2 .079	1.2 .047	15.5±1.4 .610±.055
2	0.15N{15gf}	0.020N{2gf}	3.5 .138	2 .079	1.2 .047	15.5±1.4 .610±.055

## DIMENSIONS

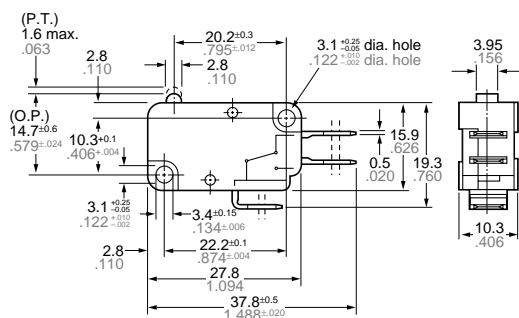
mm inch

### 1. Pin plunger

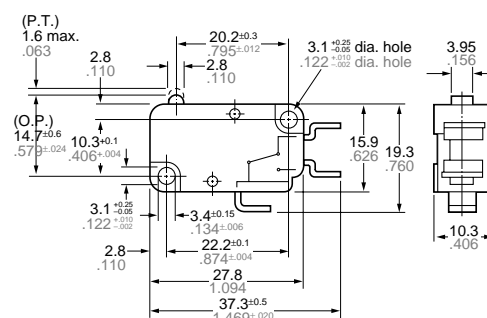
Bottom COM terminal (Guardless)



.187 Quick-connect/Solder terminal



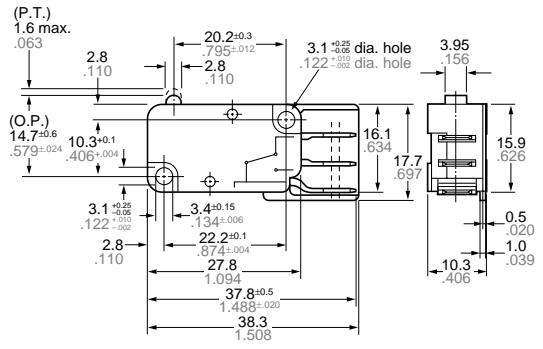
Solder terminal



Side COM terminal (with right-hand guard)



.187 Quick-connect/Solder terminal

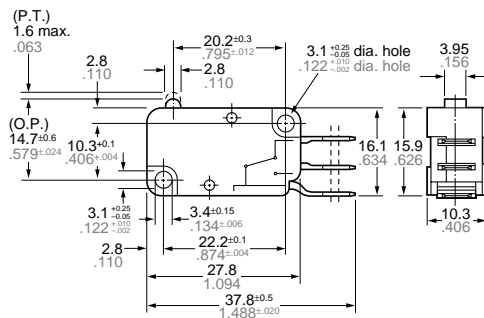


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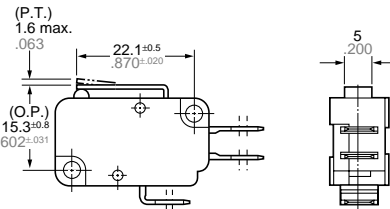
Side COM terminal (Guardless)



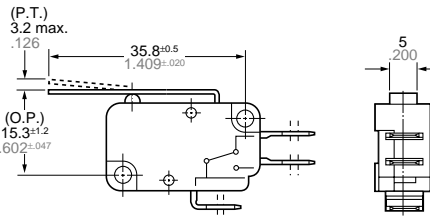
.187 Quick-connect/Solder terminal



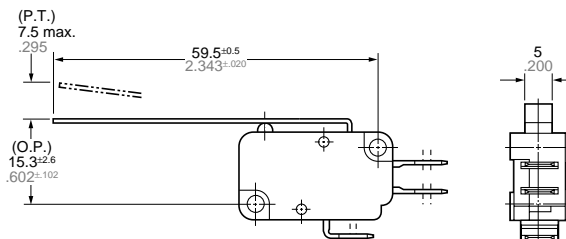
2. Short hinge lever



3. Hinge lever

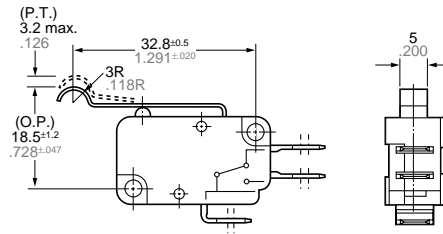


4. Long hinge lever

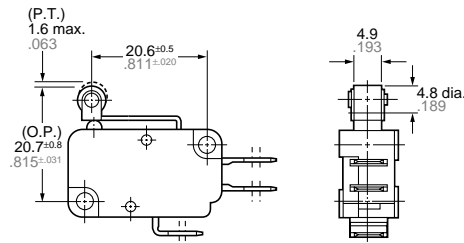


## 5. Simulated roller lever

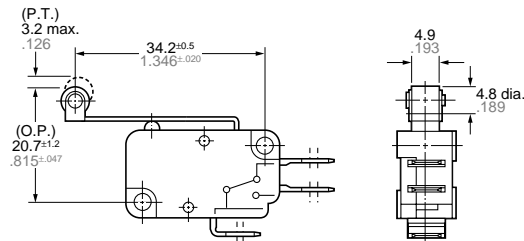
mm inch



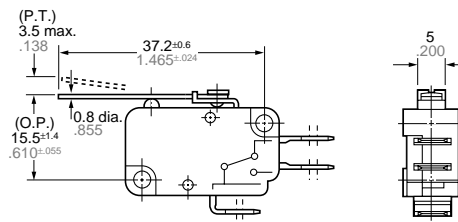
## 6. Short roller lever



## 7. Roller lever



## 8. Wire lever



## NOTES

1. Use 3.0mm mounting screws to mount switches with less than a 5 kg-cm torque. Use of screw washers or adhesive lock is recommended. Before mounting, check insulation distance between terminals as well as between terminals and ground. If enough distance is not secured, it is recommended to use insulation material in mounting.  
Set 70 to 100% overtravel in actual use. When the operation object is in the free position, force should not be applied directly to the actuator or to the pin plunger. Also force should be applied to the pin plunger from vertical direction to the switch.

2. When specifying NV switches, allow  $\pm 20\%$  to the listed operating and release forces.  
3. Hand soldering should be accomplished in less than 5 seconds, preferably with a 60 watt iron. Avoid contacting the switch case with the soldering iron.  
4. Low-level circuit type is recommended for using under low-level current and voltage.

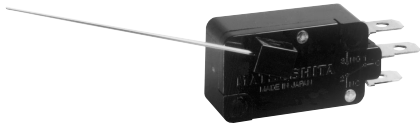
5. Avoid using NV switches in the following conditions:

- In corrosive gases, such as hydrogen sulfide.
- In flammable or explosive gases such as gasoline or thinner etc.
- In a dusty environment.
- In an ambient temperature under  $-25^{\circ}\text{C}$   $-13^{\circ}\text{F}$  or over  $80^{\circ}\text{C}$   $176^{\circ}\text{F}$ .
- In an ambient humidity over 85% R.H..

# NAIS

**HIGH CONTACT PRESSURE  
WITH LIGHT OPERATING  
ACTION**

# V-ROTARY ACTION (AHR5) SWITCHES



The AHR5 switch with actuating lever and retainer assembled

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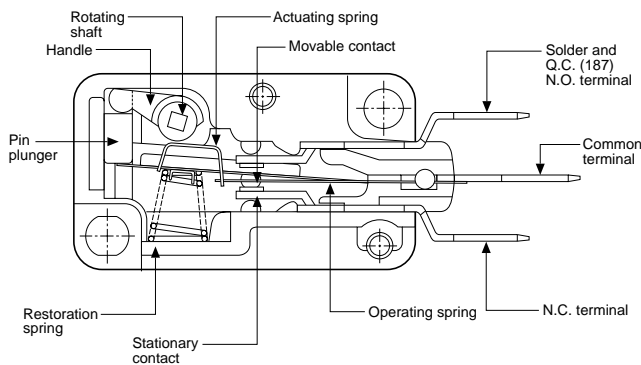
## FEATURES

- High contact pressure with light operating action
- Easy installation of the lever—Tools or adhesives are unnecessary for attaching the actuating lever
- Low-level circuit type is also available

## TYPICAL APPLICATIONS

- Vending machines

## CONSTRUCTION



## PRODUCT TYPES

Type	Retainer mounting direction	Operating force (max.)	Release force (min.)	SPDT .187 Quick-connect/solder terminal
Standard (Silver alloy)	Counter-clockwise	0.1N•cm {10.2gf•cm}	0.013N•cm {1.3gf•cm}	AHR5401
	Clockwise			AHR5411
Low-level circuit type (Gold clad)	Counter-clockwise			AHR540161
	Clockwise			AHR541161
Actuator lever	52.3mm 2.059inch	—	—	AHR5801

- Remarks: 1. The retainer is provided with the switch body without assembled.  
 2. Actuating levers are available separately.  
 (AHR5801, length: 52.3mm 2.059inch)  
 3. As for International standard, please refer to the "Information".

## SPECIFICATIONS

### 1. Contact rating (Resistive load)

Type	Standard rating	Low-level rating
Standard (Silver alloy)	5A 250V AC	
Low-level circuit type (Gold clad)	1A 250V AC	6V DC 5mA 12V DC 2mA 24V DC 1mA



# AHR5

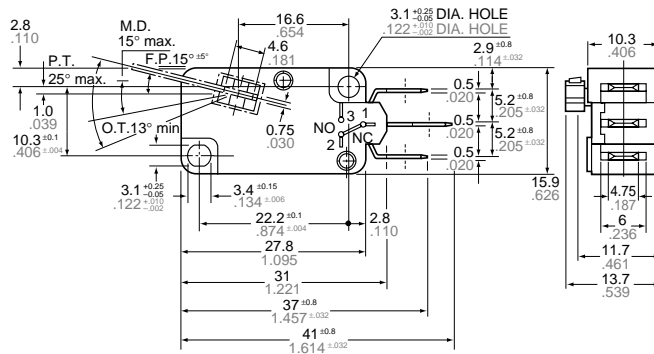
## 2. Characteristics

Type		Standard type	Low-level circuit type
Expected life (min. operations)	Mechanical (at O.T. rated)	10 <sup>6</sup> (at 60 cpm)	
	Electrical (at O.T. max.)	5 × 10 <sup>4</sup> (at 20 cpm)	
Insulation resistance		Min. 100MΩ (at 500V DC insulation resistor meter)	
Dielectric strength	Between terminals	600 Vrms for 1 min.	
	Between terminals and other exposed metal parts	2,000 Vrms for 1 min.	
	Between terminals and ground	2,000 Vrms for 1 min.	
Contact resistance (initial)		Max. 50mΩ (by voltage drop at 1A 6 to 8V DC)	Max. 50mΩ (by voltage drop at 0.1A 6 to 8V DC)
Vibration resistance (pin plunger)		10 to 55 Hz at amplitude 0.75mm (Contact opening: max. 1msec.)	
Shock resistance (pin plunger)		294m/s <sup>2</sup> {30G}	
Allowable operating speed		1 to 100°/sec.	
Max. operating cycle rate		240	
Ambient temperature		-25°C to +65°C -13°F to +149°F (no freezing below 0°C)	
Ambient humidity		Max. 85% R.H.	
Unit weight		7g .25oz	

## DIMENSIONS

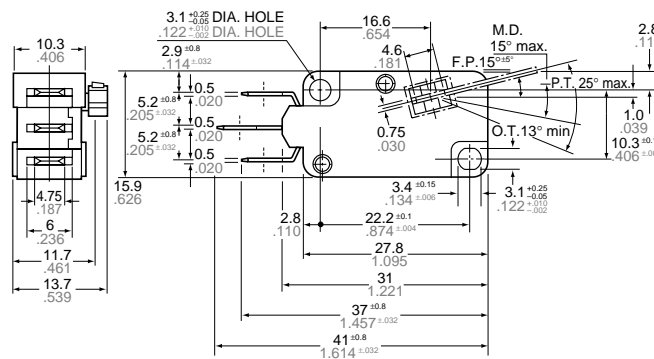
mm inch TOLERANCE: ±0.4 ±0.16

(Counterclockwise)



Operating force, Max. (Initial value)	0.1 N-cm {10.2 g·cm}
Release force, Min. (Initial value)	0.013 N-cm {1.3g·cm}
Pretravel (Initial value)	25° max.
Movement differential (Initial value)	15° max.
Overtravel (Initial value)	13° min.
Free position (Initial value)	15°±5° (From the horizontal axis)

(Clockwise)

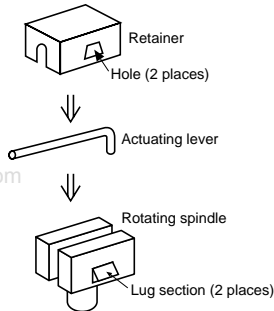


Operating force, Max. (Initial value)	0.1 N-cm {10.2 g·cm}
Release force, Min. (Initial value)	0.013 N-cm {1.3g·cm}
Pretravel (Initial value)	25° max.
Movement differential (Initial value)	15° max.
Overtravel (Initial value)	13° min.
Free position (Initial value)	15°±5° (From the horizontal axis)

## NOTES

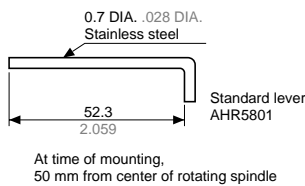
### 1. Method of attaching actuating lever

Insert the lever in the rotating spindle, then place the retainer over the spindle to lock the lever in place as shown in Fig. 1. Be sure that the retainer has snapped over the lugs on the rotating spindle, with the lugs entering fully into the holes in the retainer.



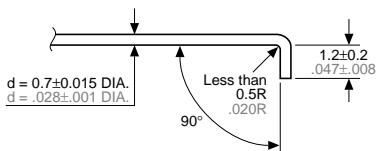
### 2. Regarding the actuating lever

As an accessory, the standard lever (Product No. AHR5801) is available separately.



### 3. Cautions regarding design of actuating lever

The dimensions of the lever at the mounting section are as shown in Fig. 2. These dimensions should be used in the design of an alternate actuating lever. The material can be stainless steel wire or piano wire. The standard lever length is 50 mm 1.969 inch. A lever in excess of this length would have a weight which could cause erroneous operation.



### 4. Regarding switch mounting

Mount the switch to a smooth surface using M3 screws. Tighten the screw with 3 to 5 kg-cm torque. To prevent loosening of the mounting screws, it is recommended that spring washers be used in combination with adhesive material for locking the screws.

In the mounted condition, the insulating distance between each terminal and ground should be checked for assurance of proper distance.

### 5. Regarding changes in operating characteristics

When selecting the V rotary action switch, allow  $\pm 20\%$  to the rated operating and release forces.

(Example)

OF: 10.2 g-cm max. specification

$10.2 \times (100 + 20\%) = 12.24$  g-cm

RF: 1.3 g-cm min. specification

$1.3 \text{ g-cm} \times (100 - 20\%) = 1.04$  g-cm

### 6. Adjustment of the operating object

The positioning of the operating object should be such that when direct force is not applied to the actuator, the actuator is in its free position. The operating object should apply force in the operating direction. The standard value of overtravel to be used should be set within the range of 70% to 100% of the rated O.T. value. Furthermore, if the operating position limit is exceeded, the electrical and mechanical life of the switch will be shortened.

### 7. Avoid using V Rotary switches in the following conditions:

- Where the ambient temperature exceeds the range of  $-25^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$   $-13^{\circ}\text{F}$  to  $+149^{\circ}\text{F}$ .
- Where the relative humidity exceeds 85%.
- Where the permissible operating speed of 1 to 100°/sec. is exceeded.
- Where the operating speed of 240 cpm. is exceeded.
- Where the lever length of 50mm 1.969inch is exceeded.

# NAIS

**HIGH CONTACT CAPACITY,  
PRECISE OPERATION**

# NZ BASIC (AM1) SWITCHES



### FEATURES

- 15 A High current switching capacity and high precision
- Wide allowance of operating speed
- Versatile variety of actuators
- UL/CSA approved

### TYPICAL APPLICATION

- General industrial machinery
- Medical equipment
- Measuring instruments
- Transportation equipment
- Home electric appliances

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## ORDERING INFORMATION

Ex. AM 1 5 0 1 K

Type of switch	Upper body cover shape & terminal	Basic specifications	Actuators
NZ basic (AM1) switch	1: Flat, solder terminal 3: Flat, screw terminal 5: Grooved, solder terminal 7: Grooved, screw terminal	0: Standard type 1: Oil tight type 3: Reversed action type 4: One way type	0: Pin plunger 1: Hinge lever (leaf spring) 3: Hinge roller lever (roller, leaf, spring) 4: Hinge short roller lever 5: Overtravel plunger 6: Compact overtravel plunger 7: Panel mount plunger 811: Panel mount roller plunger 812: Panel mount cross roller plunger

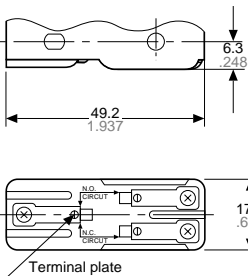
## TERMINAL VARIATION

Standard types, reversed action types and oil tight types are available in two terminal designs, solder and screw terminals, as shown in the above columns:

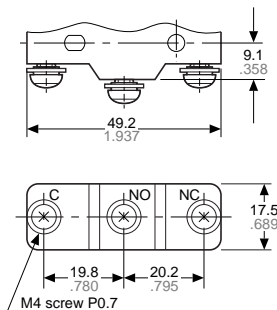
Differences in dimension between solder and screw terminals are as follows;

mm inch

Solder terminal



Screw terminal



# AM1

## PRODUCT TYPES

### 1. Standard type

Actuator	Solder terminal	Screw terminal
Pin plunger	AM1100K	AM1300K
Over travel plunger	AM1105K	AM1305K
Compact over travel plunger	AM1106K	AM1306K
Panel mount plunger	AM1107K	AM1307K
Panel mount roller plunger	AM110811K	AM130811K
Panel mount cross roller plunger	AM110812K	AM130812K
Flexible leaf lever	AM1101K	AM1301K
Flexible roller leaf lever	AM1103K	AM1303K
Rigid lever	AM1501K	AM1701K
Rigid short roller lever	AM1504K	AM1704K
Rigid roller lever	AM1503K	AM1703K
One way type•Rigid short roller lever	AM1544K	AM1744K
One way type•Rigid roller lever	AM1543K	AM1743K
Reversed action type•Rigid lever	AM1531K	AM1731K
Reversed action type •Rigid short roller lever	AM1534K	AM1734K
Reversed action type•Rigid roller lever	AM1533K	AM1733K

### 2. Oil tight types

Actuator	Solder terminal	Screw terminal
Rigid lever	AM1511K	AM1711K
Rigid short roller lever	AM1514K	AM1714K
Rigid roller lever	AM1513K	AM1713K

Remarks: 1. Standard part number indicates UL/CSA mark.

2. Standard packing for inner carton: 20cps.

## SPECIFICATIONS

### 1. Contact Rating

Type	Voltage	Resistive load ( $\cos \phi = 1$ )	Inductive load ( $\cos \phi = 0.6$ to $0.7$ )	Motor or lamp load	
				N.C.	N.O.
Standard types One way types Reversed action types	125 V AC	15 A	10 A	4 A	2 A
	250 V AC	15 A	10 A	3 A	1.5 A
	480 V AC	3 A	2 A	1.5 A	0.75 A
	125 V DC	0.5 A	0.05 A	—	—
	250 V DC	0.25 A	0.03 A	—	—
Oil tight types	125 V AC	15 A	10 A	3 A	1.5 A
	250 V AC	10 A	6 A	2 A	1.0 A
	125 V DC	0.5 A	0.05 A	—	—

### 2. Characteristics

Item		Specifications
Expected life	Mechanical	Pin plunger types
		Other types
	Electrical (at max. overtravel)	
Insulation resistance		
Dielectric strength	Between open terminals	
	Between each terminal and other exposed metal parts	
	Between each terminal and ground	
Contact resistance (initial) (by voltage drop, 1 A, 6–8 V DC)		
Vibration resistance (Pin plunger type)		
Shock resistance	Pin plunger types	
	Other types	
Allowable operating speed (at no load)		
Max. operating cycle rate (at no load)		
Ambient temperature		
Ambient humidity		
Weight		

## OPERATING CHARACTERISTICS

### Standard types

Types of actuator	Pin plunger	Overtravel plunger	Compact overtravel plunger	Panel mount plunger
Operating force, max.	3.63 N {370 gf}			
Release force, min.	1.12 N {114 gf}			
Pretravel, max. mm inch	0.4 .016			
Movement differential, max. mm inch	0.05 .002			
Overtravel, min. mm inch	0.13 .005	1.5 .059	1.5 .059	5.6 .220
Operating position, mm inch	15.9±0.4 .626±.016	28.2±0.5 1.110±.020	21.2±0.5 .835±.020	21.8±0.8 .858±.031

Types of actuator	Panel mount roller plunger	Panel mount cross roller plunger	Flexible leaf lever	Flexible roller leaf lever
Operating force, max.	3.63 N {370 gf}		1.47 N {150 gf}	
Release force, min.	1.12 N {114 gf}		0.14 N {14 gf}	
Pretravel, max. mm inch	0.4 .016		4 .157	
Movement differential, max. mm inch	0.05 .002		1.3 .051	
Overtravel, min. mm inch	3.6 .142		1.6 .063	
Operating position, mm inch	33.3±1.2 1.311±.047		17.5±0.8 .689±.031	28.6±0.8 1.126±.031

### Standard types (cont' d)

Types of actuator	Rigid lever	Rigid short roller lever	Rigid roller lever
Operating force, max.	0.69 N {70 gf}	1.57 N {160 gf}	0.98 N {100 gf}
Release force, min.	0.14 N {14 gf}	0.42 N {43 gf}	0.2 N {20 gf}
Pretravel, max. mm inch	10 .394	4.5 .177	7.5 .295
Movement differential, max. mm inch	1.3 .051	0.7 .028	1.3 .051
Overtravel, min. mm inch	5.6 .220	2.4 .094	3.6 .142
Operating position, mm inch	19.1±0.7 .752±.028	30.2±0.4 1.189±.016	30.2±0.7 1.189±.028

### One way types

Types of actuator	Rigid short roller lever	Rigid roller lever
Operating force, max.	2.23 N {227 gf}	1.67 N {170 gf}
Release force, min.	0.42 N {43 gf}	0.42 N {43 gf}
Pretravel, max. mm inch	3.5 .138	4.5 .177
Movement differential, max. mm inch	0.4 .016	0.5 .020
Overtravel, min. mm inch	1.5 .059	2.4 .094
Free position, max. mm inch	31.8 1.252	43.3 1.705
Operating position, mm inch	30.2±0.4 1.189±.016	41.3±0.4 1.626±.016

### Reversed action types

Types of actuator	Rigid lever	Rigid short roller lever	Rigid roller lever
Operating force, max.	1.67 N {170 gf}	5.30 N {540 gf}	2.35 N {240 gf}
Release force, min.	0.27 N {28 gf}	1.67 N {170 gf}	0.56 N {57 gf}
Pretravel, max. mm inch	5.0 .197	2.5 .098	3.6 .142
Movement differential, max. mm inch	0.9 .035	0.4 .016	0.7 .028
Overtravel, min. mm inch	5.6 .220	2.0 .079	4.0 .157
Operating position, mm inch	19.1±0.8 .752±.031	30.2±0.5 1.189±.020	30.2±0.8 1.189±.031

### Oil tight types

Types of actuator	Rigid lever	Rigid short roller lever	Rigid roller lever
Operating force, max.	0.69 N {70 gf}	1.67 N {170 gf}	0.98 N {100 gf}
Release force, min.	0.14 N {14 gf}	0.42 N {43 gf}	0.20 N {20 gf}
Pretravel, max. mm inch	10 .394	4.5 .177	7.5 .295
Movement differential, max. mm inch	1.5 .059	0.7 .028	1.3 .051
Overtravel, min. mm inch	5.6 .220	2.4 .094	3.6 .142
Operating position, mm inch	19.1±0.7 .752±.028	30.2±0.4 1.189±.016	30.2±0.7 1.189±.028

# AM1

## DIMENSIONS

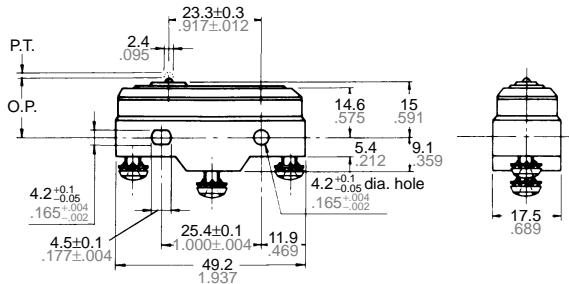
mm inch General tolerance:  $\pm 0.4 \pm 0.16$

### 1. Standard types

#### Pin plunger



AM1100K (Solder terminal)  
AM1300K (Screw terminal)



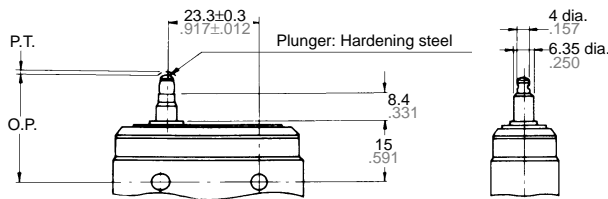
Operating force, max.	3.63 N {370 gf}
Release force, min.	1.12 N {114 gf}
Pretravel, max. mm inch	0.4 .016
Movement differential, max. mm inch	0.05 .002
Overtravel, min. mm inch	0.13 .005
Operating position, mm inch	15.9 ± 0.4 .626 ± 0.016

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#### Overtravel plunger



AM1105K (Solder terminal)  
AM1305K (Screw terminal)

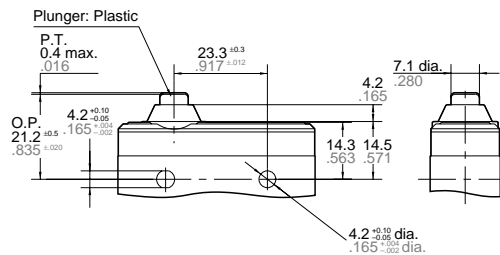


Operating force, max.	3.63 N {370 gf}
Release force, min.	1.12 N {114 gf}
Pretravel, max. mm inch	0.4 .016
Movement differential, max. mm inch	0.05 .002
Overtravel, min. mm inch	1.5 .059
Operating position, mm inch	28.2 ± 0.5 1.110 ± 0.020

#### Compact over plunger



AM1106K (Solder terminal)  
AM1306K (Screw terminal)

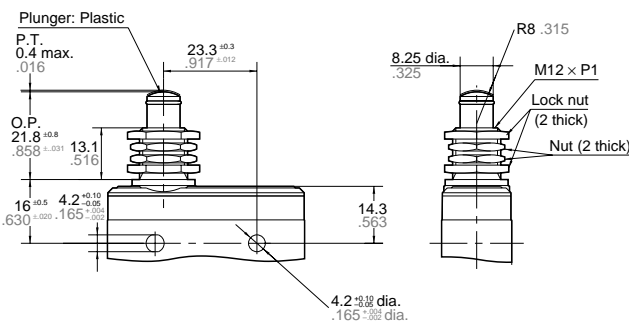


Operating force, max.	3.63 N {370 gf}
Release force, min.	1.12 N {114 gf}
Pretravel, max. mm inch	0.4 .016
Movement differential, max. mm inch	0.05 .002
Overtravel, min. mm inch	1.5 .059
Operating position, mm inch	21.2 ± 0.5 .835 ± 0.020

#### Panel mount plunger



AM1107K (Solder terminal)  
AM1307K (Screw terminal)



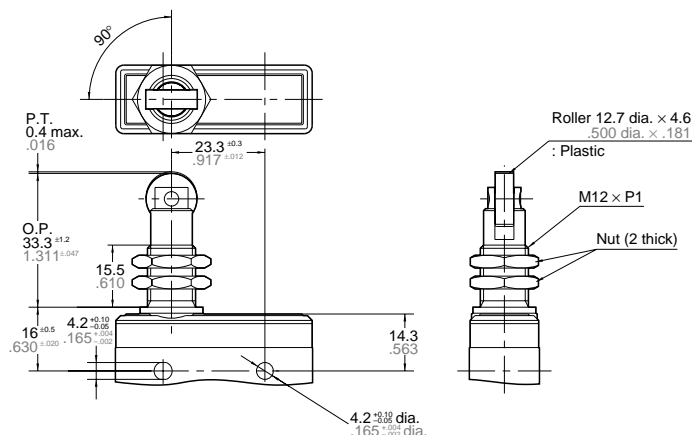
Operating force, max.	3.63 N {370 gf}
Release force, min.	1.12 N {114 gf}
Pretravel, max. mm inch	0.4 .016
Movement differential, max. mm inch	0.05 .002
Overtravel, min. mm inch	5.6 .220
Operating position, mm inch	21.8 ± 0.8 .858 ± 0.031

## Panel mount roller plunger

mm inch General tolerance:  $\pm 0.4 \pm 0.16$



AM110811K (Solder terminal)  
AM130811K (Screw terminal)

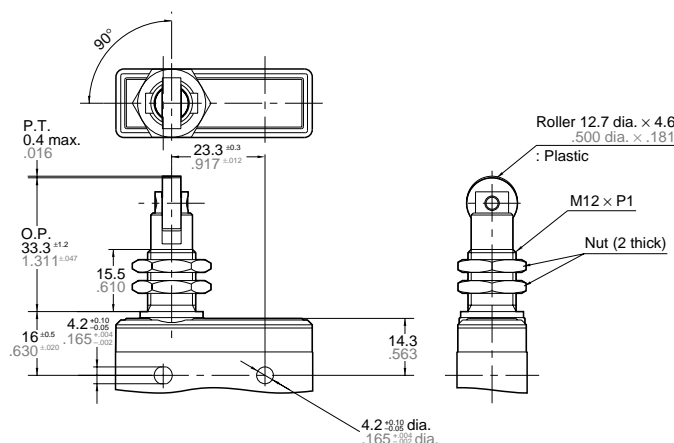


Operating force, max.	3.63 N {370 gf}
Release force, min.	1.12 N {114 gf}
Pretravel, max. mm inch	0.4 .016
Movement differential, max. mm inch	0.05 .002
Overtravel, min. mm inch	3.6 .142
Operating position, mm inch	33.3 $\pm$ 1.2 1.311 $\pm$ .047

## Panel mount cross roller plunger



AM110812K (Solder terminal)  
AM130812K (Screw terminal)



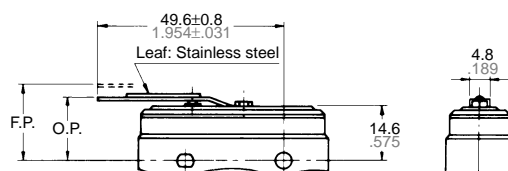
Operating force, max.	3.63 N {370 gf}
Release force, min.	1.12 N {114 gf}
Pretravel, max. mm inch	0.4 .016
Movement differential, max. mm inch	0.05 .002
Overtravel, min. mm inch	3.6 .142
Operating position, mm inch	33.3 $\pm$ 1.2 1.311 $\pm$ .047

Dimensions and Operating characteristics are the same as those of Panel mount roller plunger type. However, the roller joins the switch body at an angle of 90°.

## Flexible leaf lever



AM1101K (Solder terminal)  
AM1301K (Screw terminal)

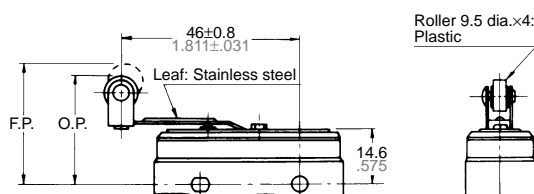


Operating force, max.	1.47 N {150 gf}
Release force, min.	0.14 N {14 gf}
Pretravel, max. mm inch	4 .157
Movement differential, max. mm inch	1.3 .051
Overtravel, min. mm inch	1.6 .063
Operating position, mm inch	17.5 $\pm$ 0.8 .689 $\pm$ .031

## Flexible roller leaf lever



AM1103K (Solder terminal)  
AM1303K (Screw terminal)



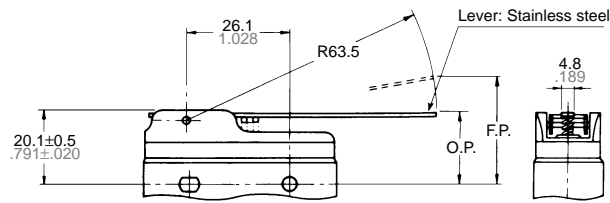
Operating force, max.	1.47 N {150 gf}
Release force, min.	0.14 N {14 gf}
Pretravel, max. mm inch	4 .157
Movement differential, max. mm inch	1.3 .051
Overtravel, min. mm inch	1.6 .063
Operating position, mm inch	28.6 $\pm$ 0.8 1.126 $\pm$ .031

# AM1

## Rigid lever



AM1501K (Solder terminal)  
AM1701K (Screw terminal)



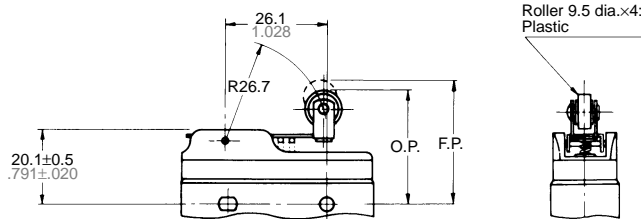
mm inch General tolerance:  $\pm 0.4 \pm 0.16$

Operating force, max.	0.69 N {70 gf}
Release force, min.	0.14 N {14 gf}
Pretravel, max. mm inch	10 .394
Movement differential, max. mm inch	1.3 .051
Overtravel, min. mm inch	5.6 .220
Operating position, mm inch	19.1±0.7 .752±.028

## Rigid short roller lever



AM1504K (Solder terminal)  
AM1704K (Screw terminal)

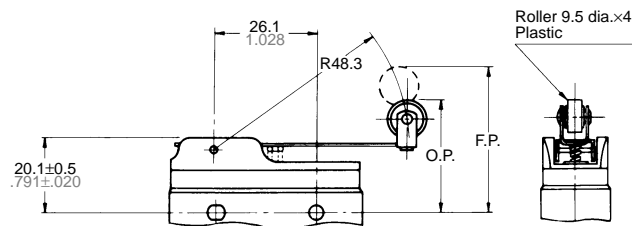


Operating force, max.	1.57 N {160 gf}
Release force, min.	0.42 N {43 gf}
Pretravel, max. mm inch	4.5 .177
Movement differential, max. mm inch	0.7 .028
Overtravel, min. mm inch	2.4 .094
Operating position, mm inch	30.2±0.4 1.189±.016

## Rigid roller lever



AM1503K (Solder terminal)  
AM1703K (Screw terminal)



Operating force, max.	0.98 N {100 gf}
Release force, min.	0.2 N {20 gf}
Pretravel, max. mm inch	7.5 .295
Movement differential, max. mm inch	1.3 .051
Overtravel, min. mm inch	3.6 .142
Operating position, mm inch	30.2±0.7 1.189±.028

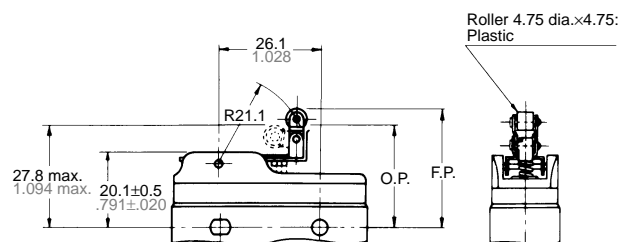
## 2. One way types

This type is operated only to one direction, not to the reversed direction by the construction of the roller lever, pivoting away from the cam on the return stroke.

### Rigid short roller lever



AM1544K (Solder terminal)  
AM1744K (Screw terminal)



Operating force, max.	2.23 N {227 gf}
Release force, min.	0.42 N {43 gf}
Pretravel, max. mm inch	3.5 .138
Movement differential, max. mm inch	0.4 .016
Overtravel, min. mm inch	1.5 .059
Operating position, mm inch	30.2±0.4 1.189±.016

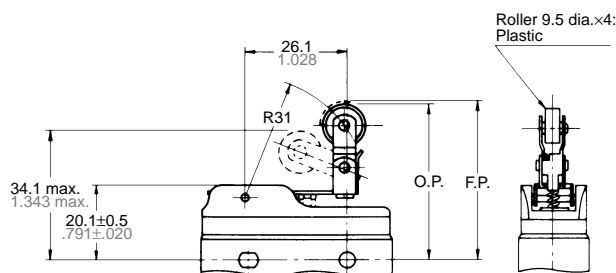


## Rigid roller lever

mm inch General tolerance:  $\pm 0.4 \pm 0.16$



AM1543K (Solder terminal)  
AM1743K (Screw terminal)



Operating force, max.	1.67 N {170 gf}
Release force, min.	0.42 N {43 gf}
Pretravel, max. mm inch	4.5 .177
Movement differential, max. mm inch	0.5 .020
Overtravel, min. mm inch	2.4 .094
Operating position, mm inch	41.3±0.4 1.626±0.16

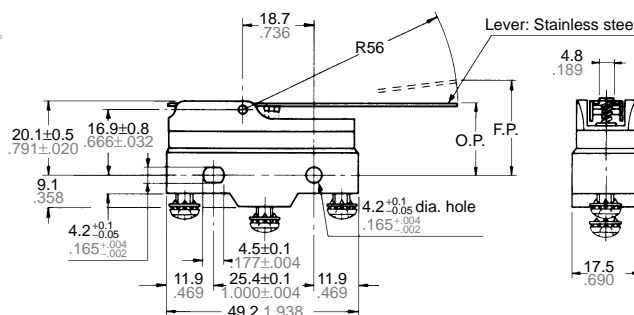
### 3. Reversed action types

When the actuator is operated, the switching mechanism returns to the free position. Extraordinary force by pushing the plunger too much is not put on the switching mechanism, which means stability in life.

#### Rigid lever



AM1531K (Solder terminal)  
AM1731K (Screw terminal)

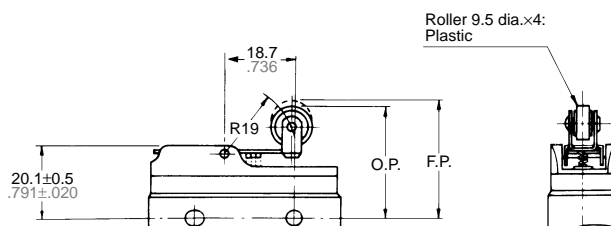


Operating force, max.	1.67 N {170 gf}
Release force, min.	0.27 N {28 gf}
Pretravel, max. mm inch	5.0 .197
Movement differential, max. mm inch	0.9 .035
Overtravel, min. mm inch	5.6 .220
Operating position, mm inch	19.1±0.8 .752±0.31

#### Rigid short roller lever



AM1534K (Solder terminal)  
AM1734K (Screw terminal)

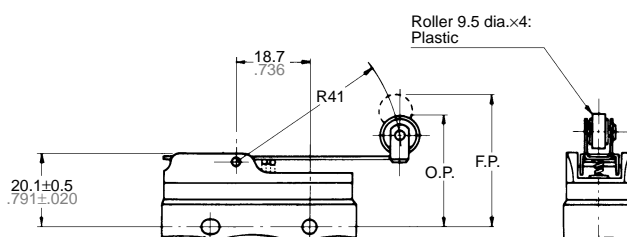


Operating force, max.	5.30 N {540 gf}
Release force, min.	1.67 N {170 gf}
Pretravel, max. mm inch	2.5 .098
Movement differential, max. mm inch	0.4 .016
Overtravel, min. mm inch	2.0 .079
Operating position, mm inch	30.2±0.5 1.189±0.20

#### Rigid roller lever



AM1533K (Solder terminal)  
AM1733K (Screw terminal)



Operating force, max.	2.35 N {240 gf}
Release force, min.	0.56 N {57 gf}
Pretravel, max. mm inch	3.6 .142
Movement differential, max. mm inch	0.7 .028
Overtravel, min. mm inch	4.0 .157
Operating position, mm inch	30.2±0.8 1.189±0.31

# AM1

## 4. Oil tight types

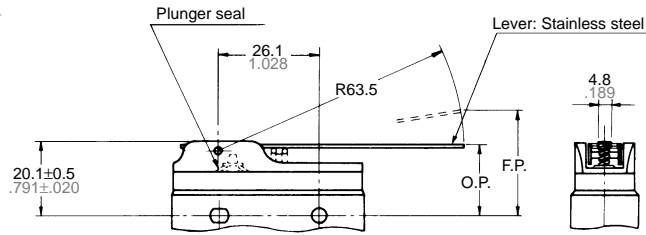
mm inch General tolerance:  $\pm 0.4 \pm 0.16$

The pushbutton part is sealed with the rubber cap and the connected part between the cap and body is also coated with resin so that these parts are kept off from foreign matters. This type has resistance to oil.

Rigid lever



AM1511K (Solder terminal)  
AM1711K (Screw terminal)

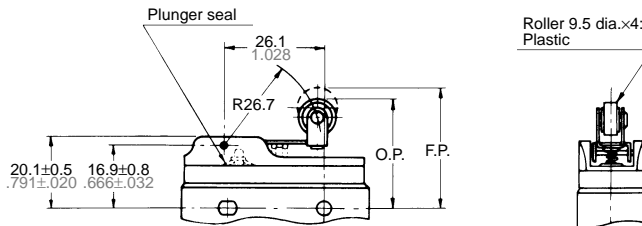


Operating force, max.	0.69 N {70 gf}
Release force, min.	0.14 N {14 gf}
Pretravel, max. mm inch	10 .394
Movement differential, max. mm inch	1.5 .059
Overtravel, min. mm inch	5.6 .220
Operating position, mm inch	19.1±0.7 .752±.028

Rigid short roller lever



AM1514K (Solder terminal)  
AM1714K (Screw terminal)

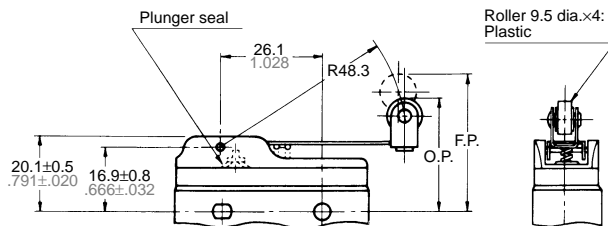


Operating force, max.	1.67 N {170 gf}
Release force, min.	0.42 N {43 gf}
Pretravel, max. mm inch	4.5 .177
Movement differential, max. mm inch	0.7 .028
Overtravel, min. mm inch	2.4 .094
Operating position, mm inch	30.2±0.4 1.189±.016

Rigid roller lever



AM1513K (Solder terminal)  
AM1713K (Screw terminal)



Operating force, max.	0.98 N {100 gf}
Release force, min.	0.20 N {20 gf}
Pretravel, max. mm inch	7.5 .295
Movement differential, max. mm inch	1.3 .051
Overtravel, min. mm inch	3.6 .142
Operating position, mm inch	30.2±0.7 1.189±.028

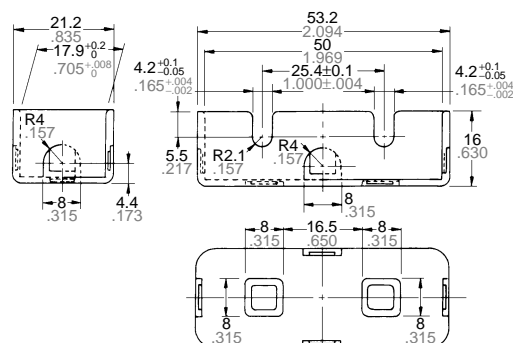
## TERMINAL COVER FOR NZ BASIC SWITCHES

### Terminal cover

(for the standard type with soldering terminal)



AA7000



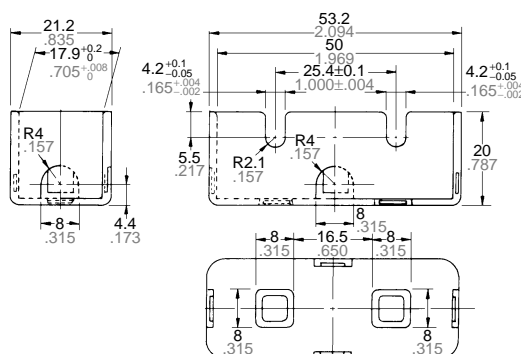
1. Terminal cover can protect switches from external force and the leakage between terminals can be avoided. Also it can be a simple safety protector because the direct touch of fingers to terminals can be avoided.
2. Nylon 66 is used for higher durability.
3. The height of terminal cover for the solder types is lower than terminal cover for the screw types.
4. AA7000 and AA8000 have 6 knock-out portions. Lead wire can be taken out from any desired portion.

### Terminal cover

(for the standard type with screw terminal)



AA8000



## NOTES

### 1. Regarding fastening of switch body

- 1) In fastening the switch body, use M4 mounting screws to attach switches with the torque 1.5 N·m {15 kg·cm} or less.
- 2) After mounting and wiring, the insulation distance between ground and each terminal should be confirmed as sufficient.

### 2. Adjustment of the operating device

The operating device should be positioned so that it applies no stress to the pushbutton or actuator when the switch is in the open position. If this condition is exceeded, the mechanical and electrical performance will be impaired. In addition, the force applied by the operating device should be in a perpendicular direction. Even if the pushbutton is used in the full total travel position, there will be no influence on the life of the switch.

### 3. Soldering operations

Soldering should be done in less than 5 seconds, with a 60 watt iron (tip temperature = 350°C 662°F max.). Care should be taken not to apply force to the terminal during soldering.

### 4. Avoid using switches in the following conditions:

- In corrosive gases such as hydrogen sulfide.
- In flammable or explosive gases such as gasoline or thinner etc.
- In a dusty environment.
- In an ambient humidity over 85%.
- In the conditions where the perpendicular operating speed is less than 0.1 mm/sec. or more than 1,000 mm/sec.
- In a silicon atmosphere.

### 5. Others

Caution should be taken not to drop switches.



**ULTRA-LONG STROKE,  
HIGH CONTACT  
RELIABILITY SEAL  
SWITCHES  
(SAME SIZE AS J TYPE)**

**TURQUOISE  
STROKE  
SWITCHES**



www.DataSheet4U.com

**FEATURES**

**1. Same size as J type with ultra-long stroke. For pin plunger type, it maintains an ultra-long stroke O.T. (Over Travel) with over 2.2 mm on the NO side and over 2.5 mm on the NC side. Variations in operation can be absorbed.**

**2. Since contact pressure does not depend on the operation stroke, the range of possible use over the entire stroke is greatly increased.**

(Please refer to operation concept diagram.)

**3. High contact reliability to support low level switching loads**

High contact reliability is maintained with gold plating on both sides of sliding contact.

**4. Highly effective sealing for resistance against adverse environments**

**Immersion protection type**

- JIS C0920 (water-resistance experiments for electrical machines and protection rating against incursion of solid substances)

**D2**

- JIS D0203 (method for testing moisture resistance and water resistance in automotive components)

**IP67**

- IEC529 (rating for outer shell protection)

**5. Silent operation**

With sliding contact construction there is no operation noise.

**6. Direct operation possible from lateral direction with pin plunger (lever-less operation allows space savings)**

**7. Contains no harmful substances (mercury, lead, hexivalent chrome, cadmium)**

**TYPICAL APPLICATIONS**

**1. Automobiles (detection of door opening and closing and shift lever position, etc.)**

**2. Household appliances (propane stoves, vacuum cleaners, air conditioners, and washing machines, etc.)**

**ORDERING INFORMATION**

Ex. ASQ1

Type of switch	Size of mounting hole	Terminal	Contact form	Actuator
ASQ1: Turquoise stroke switch	0: 3 mm <b>.118 inch</b> standard type 1: 3 mm <b>.118 inch</b> without boss type	2: Wire leads right side type (NC and NO type only) 3: Wire leads left side type (NC and NO type only) 4: Solder terminal 5: PC board terminal 6: Wire leads (bottom type)	1: SPDS 2: SPST-NC (wire lead type only) 3: SPST-NO (wire lead type only)	0: Pin plunger 7: Leaf lever 8: Simulated leaf lever

Remark: Not every combination is available. Please refer to the following table, "PRODUCT TYPES".

**TURQUOISE STROKE SWITCHES  
AKCT1B62E '03.9**

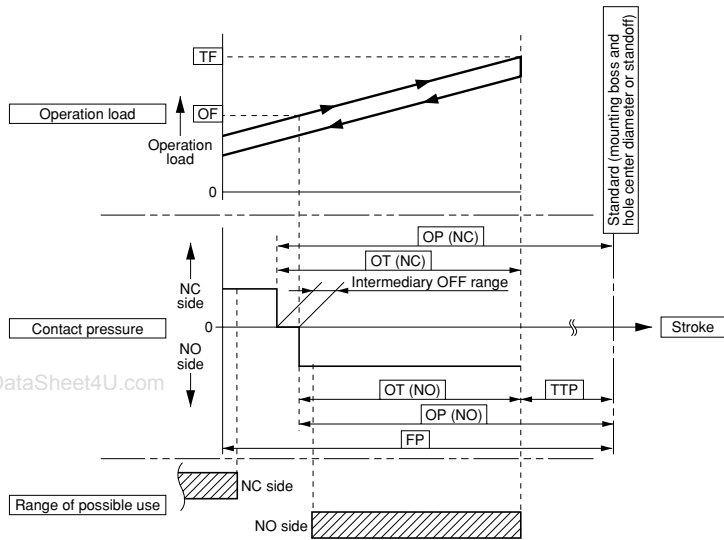
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## OPERATION CONCEPT DIAGRAM (reference)

Contact form: terminal type



## PRODUCT TYPES

### 1. Terminal type (Mounting hole: 3mm standard type/3mm without boss type)

Actuator	Operating force Max.	Mounting hole: 3mm standard type		Mounting hole: 3mm without boss type	
		Solder terminal		PC board terminal	
Pin plunger	1.5N	ASQ10410		ASQ11510	
Leaf lever	1.7N	ASQ10417		ASQ11517	
Simulated leaf lever	1.5N	ASQ10418		ASQ11518	

### 2. Wire leads bottom type (Mounting hole: 3mm standard type)

Actuator	Operating force Max.	Wire leads bottom type (Mounting hole: 3mm standard type)		
		Switching type	NC type	NO type
Pin plunger	1.5N	ASQ10610	ASQ10620	ASQ10630
Leaf lever	1.7N	ASQ10617	ASQ10627	ASQ10637
Simulated leaf lever	1.5N	ASQ10618	ASQ10628	ASQ10638

### 3. Wire leads side type (Mounting hole: 3mm standard type)

Actuator	Operating force Max.	Wire leads right side type (Mounting hole: 3mm standard type)		Wire leads left side type (Mounting hole: 3mm standard type)	
		NC type	NO type	NC type	NO type
Pin plunger	1.5N	ASQ10220	ASQ10230	ASQ10320	ASQ10330
Leaf lever	1.7N	ASQ10227	ASQ10237	ASQ10327	ASQ10337
Simulated leaf lever	1.5N	ASQ10228	ASQ10238	ASQ10328	ASQ10338

## RATING

### 1. Rating

1 mA, 5 V DC to 100 mA, 30 V DC

Note: Please consult us regarding 42 V DC rating.

### 2. Operation environment and conditions

Item	Specifications
Ambient and storage temperature	-40°C to +85°C -40°F to +185°F (no freezing and condensing)
Allowable operating speed	30 to 500 mm/sec.
Max. operating cycle rate	120 cpm

Note: When switching at low and high speeds or under vibration, or in high-temperature, high-humidity environments, working life and performance may be reduced remarkably depending on the load capacity. Please consult us.

### 3. Electrical characteristics

Withstand voltage (Initial)	Between non-continuous terminals: 600 Vrms, Between each terminal and other exposed metal parts: 1,500 Vrms, Between each terminal and ground: 1,500 Vrms (at detection current of 1 mA)
Insulation resistance (Initial)	Min. 100 MΩ (at 100 V DC insulation resistance meter) (Locations measured same as withstand voltage.)
Contact resistance (Initial)	Max. 1 Ω (at contact resistance meter)

#### 4. Characteristics

Item		Specifications	
Electrical switching life	5 V DC 1 mA (resistive load)	Min. $5 \times 10^5$	Switching frequency: 20 times/min. Conduction ratio: 1:1 Pushbutton operation speed: 100 mm/s Pushbutton switching position: free position (FP) to operation limit position (TTP)
	16 V DC 50 mA (resistive load)	Min. $5 \times 10^5$	
	30 V DC 100 mA (resistive load)	Min. $2 \times 10^5$	
Vibration resistance (malfunction vibration resistance)	Single amplitude: 0.75 mm Amplitude of vibration: 10 to 55 Hz (4 minutes cycle) Direction and time: 30 minutes each in X, Y and Z directions		
	Amplitude of vibration: 5 to 200 Hz (10 minutes cycle) Acceleration: 43.1 m/s <sup>2</sup> Direction and time: 30 minutes each in X, Y and Z directions		
Shock resistance (malfunction shock resistance)	Shock value: 980 m/s <sup>2</sup> Direction and time: 5 times each in X, Y and Z directions		
Vibration resistance endurance	Frequency of vibration: 33.3 Hz, Acceleration: 43.1 m/s <sup>2</sup> Direction and time: 8 hours each in X, Y and Z directions		
Terminal strength	6 N min. (each direction) *Terminal deformation possible.		
Heat resistance	85°C 185°F 500 heures		
Cold resistance	-40°C -40°F 500 heures		
Humidity resistance	40°C 104°F 95% RH 500 heures		
High-temperature, high-humidity resistance	85°C 185°F 85% RH 500 heures		
Thermal shock resistance	30 min. at 85°C 185°F to 30 min at -40°C -40°F for 1,000 cycles		
Water resistance	Submersed for 30 min. under 1 m of water.		

Notes: As long as there are no particular designations, the following conditions apply to the test environment.

- Ambient temperature: 5 to 35°C 41 to 95°F
- Relative humidity: 25 to 85% RH
- Air pressure: 86 to 106 kpa

#### 5. Protective structure

##### 1) JIS C0920: Waterproof type

A concrete testing method is to check for any adverse effect on the structure after leaving it submerged for 30 minutes under 1 m 3.281 ft of water (with temperature difference between water and switch no larger than 5°C 41°F).

##### 2) IEC 529: IP67 (waterproof type)

A concrete testing method is to check for any adverse effect on the structure after leaving it submerged for 30 minutes under 1 m 3.281 ft of water (with temperature difference between water and switch no larger than 5°C 41°F).

##### 3) JIS D0203: Equivalent of D2

A concrete testing method is to check for any adverse effect on the structure after leaving it submerged for 30 minutes under 10 cm 3.937 inch of water (with temperature difference between water and switch no larger than 30°C 86°F).

Note: Names of the standards can be found in the section describing features.

#### 6. Operating characteristics

Actuator		Pin plunger	Leaf lever	Simulated leaf lever
Operating Force (max. O.F.) *Note 2		1.5N	1.7N	1.5N
Total travel Force (max. T.F.) (reference value)		(2.0N)	(3.1N)	(2.8N)
Free Position (max. F.P.)	From mounting boss and hole center line	9.2mm .362inch	11.5mm .453inch	14.4mm .567inch
	From standoff	13.4mm .528inch	15.7mm .618inch	18.6mm .732inch
Operating Position on NC side O.P. (N.C.) *Note 3	From mounting boss and hole center line	8.7±0.3mm .343±.012inch	9.8±0.5mm .386±.020inch	12.5±0.5mm .492±.020inch
	From standoff	12.9±0.3mm .508±.012inch	14.0±0.5mm .551±.020inch	16.7±0.5mm .657±.020inch
Operating Position on NO side O.P. (N.O.) *Note 4	From mounting boss and hole center line	8.4±0.3mm .331±.012inch	9.3±0.5mm .366±.020inch	12.0±0.5mm .472±.020inch
	From standoff	12.6±0.3mm .496±.012inch	13.5±0.5mm .531±.020inch	16.2±0.5mm .638±.020inch
Over travel on N.C. side (min. O.T. (N.C.))		2.5mm .098inch	3.1mm .122inch	3.3mm .130inch
Over travel on N.O. side (min. O.T. (N.O.))		2.2mm .087inch	2.6mm .102inch	2.8mm .110inch
Total Travel Position (T.T.P.) (reference value)	From mounting boss and hole center line	(5.9mm .232inch)	(6.2mm .244inch)	(8.7mm .343inch)
	From standoff	(10.1mm .398inch)	(10.4mm .409inch)	(12.9mm .508inch)

Notes: 1. The above indicates the characteristics when operating the pushbutton from the vertical direction.

2. Indicates operation load for NO contact to achieve ON status.

3. Indicates position for NC contact to achieve OFF status.

4. Indicates position for NO contact to achieve ON status.

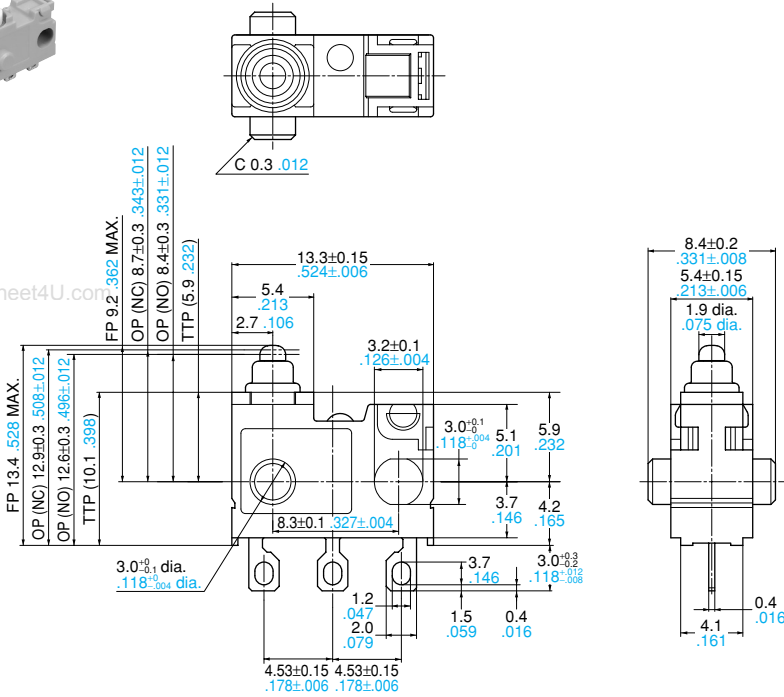
# ASQ1

## DIMENSIONS

mm inch General tolerance:  $\pm 0.25$   $\pm 0.10$

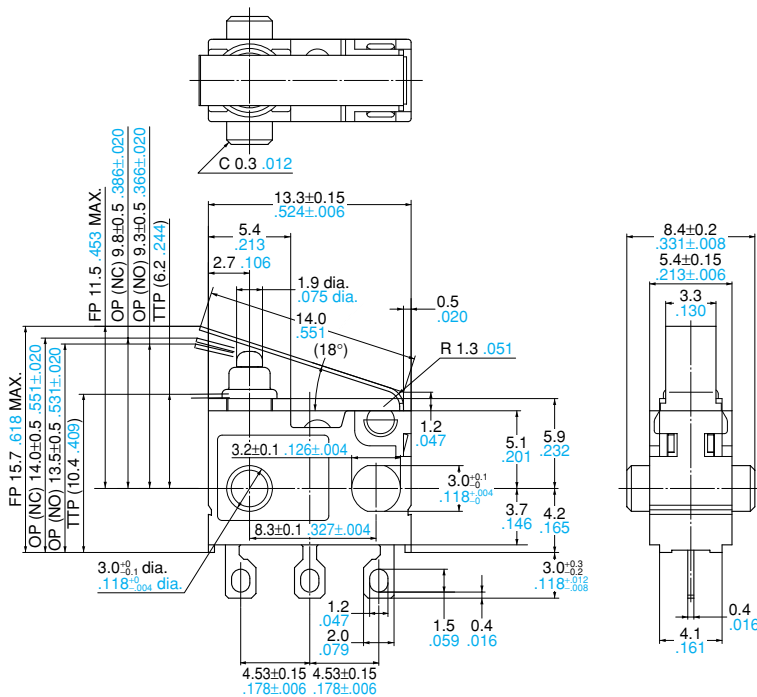
### 1. Terminal type: Mounting hole 3mm, standard type

Pin plunger



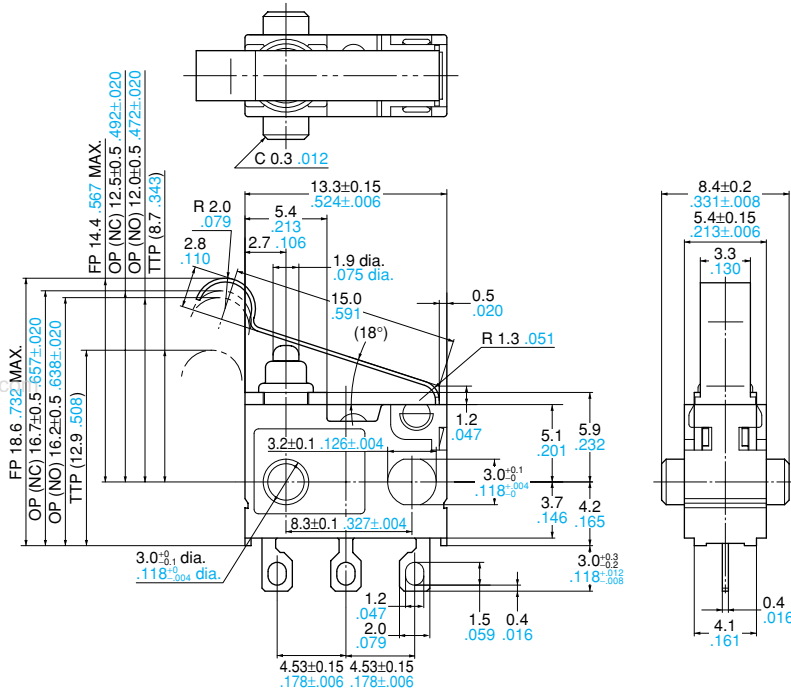
Operating Force (max. O.F.)		1.5N
Free Position (max. F.P.)	From mounting boss and hole center line	9.2mm .362inch
	From standoff	13.4mm .528inch
Operating Position on NC side O.P. (N.C.)	From mounting boss and hole center line	8.7±0.3mm .343±.012inch
	From standoff	12.9±0.3mm .508±.012inch
Operating Position on NO side O.P. (N.O.)	From mounting boss and hole center line	8.4±0.3mm .331±.012inch
	From standoff	12.6±0.3mm .496±.012inch
Over travel on N.C. side (min. O.T. (N.C.))		2.5mm .098inch
Over travel on N.O. side (min. O.T. (N.O.))		2.2mm .087inch

### Leaf lever



Operating Force (max. O.F.)		1.7N
Free Position (max. F.P.)	From mounting boss and hole center line	11.5mm .453inch
	From standoff	15.7mm .618inch
Operating Position on NC side O.P. (N.C.)	From mounting boss and hole center line	9.8±0.5mm .386±.020inch
	From standoff	14.0±0.5mm .551±.020inch
Operating Position on NO side O.P. (N.O.)	From mounting boss and hole center line	9.3±0.5mm .366±.020inch
	From standoff	13.5±0.5mm .531±.020inch
Over travel on N.C. side (min. O.T. (N.C.))		3.1mm .122inch
Over travel on N.O. side (min. O.T. (N.O.))		2.6mm .102inch

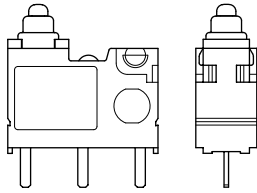
Note: When switching at high speed or under shock, lever endurance may drop. Therefore, please be sure to conduct an endurance evaluation under actual switching conditions.



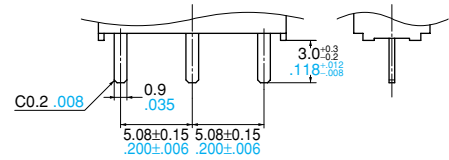
Operating Force (max. O.F.)		1.5N
Free Position (max. F.P.)	From mounting boss and hole center line	14.4mm .567inch
	From standoff	18.6mm .732inch
Operating Position on NC side O.P. (N.C.)	From mounting boss and hole center line	12.5±0.5mm .492±.020inch
	From standoff	16.7±0.5mm .657±.020inch
Operating Position on NO side O.P. (N.O.)	From mounting boss and hole center line	12.0±0.5mm .472±.020inch
	From standoff	16.2±0.5mm .638±.020inch
Over travel on N.C. side (min. O.T. (N.C.))		3.3mm .130inch
Over travel on N.O. side (min. O.T. (N.O.))		2.8mm .110inch

Note: When switching at high speed or under shock, lever endurance may drop. Therefore, please be sure to conduct an endurance evaluation under actual switching conditions.

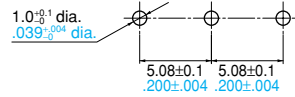
Mounting hole: 3 mm without boss type



PC board terminal



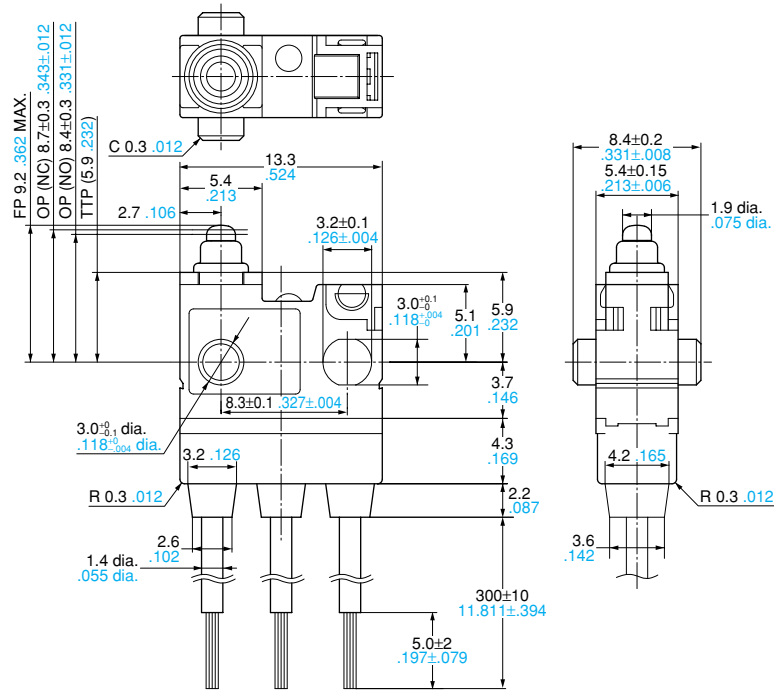
PC board pattern



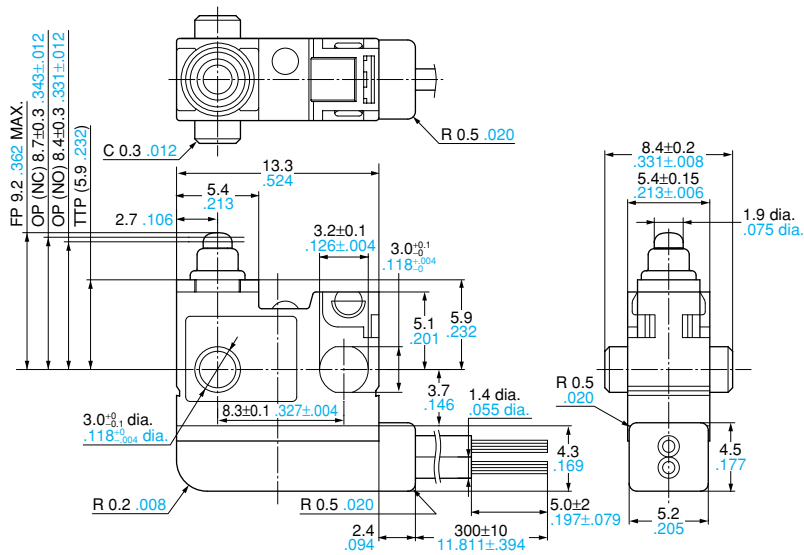


## 2. Wire leads bottom type: Mounting hole 3mm, standard type

mm inch General tolerance:  $\pm 0.25$   $\pm 0.010$

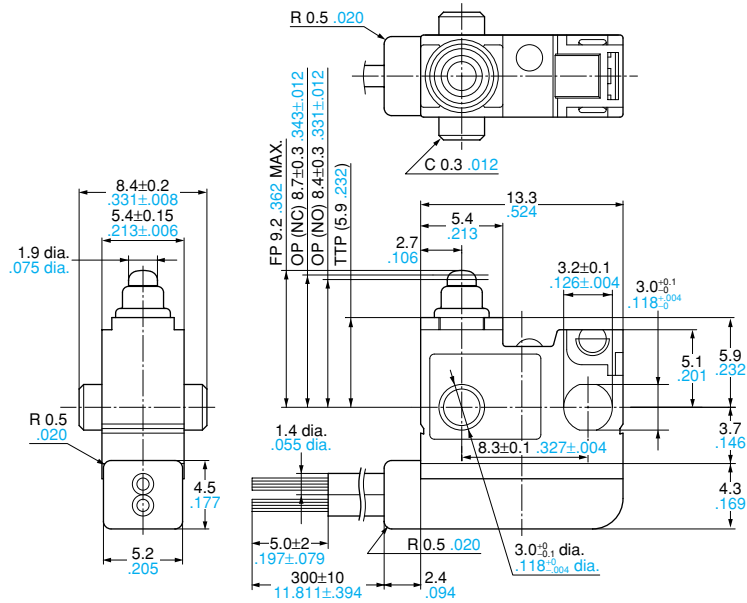


## 3. Wire leads right side type: Mounting hole 3mm, standard type



4. Wire leads left side type: Mounting hole 3mm, standard type

mm inch General tolerance: ±0.25 ±.010



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NOTES

1. Soldering conditions

The application of excessive heat upon the switch when soldering can cause degradation of switch operation. Therefore, be sure to keep within the conditions given below.

1) Manual soldering: use soldering irons (max. 350°C 662°F, within 3 seconds) capable of temperature adjustment. This is to prevent deterioration due to soldering heat. Care should be taken not to apply force to the terminals during soldering.

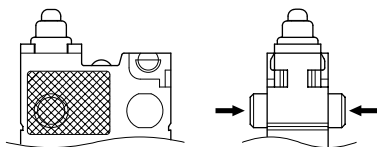
2) Automatic soldering: Soldering must be done as below;

260°C 500°F: within 6 seconds

350°C 662°F: within 3 seconds

2. Mounting

Please avoid use in which load would be applied to the sides (hatch part (both sides) shown below) of the switch in the direction indicated by the arrows. This could cause erroneous operation. Also, when using a metal installation board, please make considerations for burr direction designation and burr suppressing, etc., so that the burr side will not be on the switch installation side.



1) To secure the switch, please use an M3 small screw on a flat surface and tighten using a maximum torque of 0.29 N·m. It is recommended that spring washers be used with the screws and adhesive be applied to lock the screws to prevent loosening of

the screws. Please make sure not to apply adhesive onto the moving parts.

2) Be sure to maintain adequate insulating clearance between each terminal and ground.

3) Although it is possible to directly operate the pin plunger type from the lateral direction, please consult us if doing so.

4) After mounting please make sure no pulling load will be applied to the switch terminals.

5) Range of possible use: Please set the operation position to within the ranges in the following table so that there is sufficient insulation distance and to maintain contact reliability.

mm inch

Actuator	Plunger/lever free	
	From mounting boss and hole center line	From standoff
Pin plunger	>9.2 >.362	>10.4 >.409
Leaf lever	>10.7 >.421	>14.9 >.587
Simulated leaf lever	>13.5 >.531	>17.7 >.697

Actuator	Plunger/Lever pushed	
	From mounting boss and hole center line	From standoff
Pin plunger	7.8 to 5.9 .307 to .232	12.0 to 10.1 .472 to .398
Leaf lever	8.4 to 6.2 .331 to .244	12.6 to 10.4 12.6 to .409
Simulated leaf lever	11.1 to 8.7 .437 to .343	15.3 to 12.9 15.3 to .508

3. Cautions regarding the circuit

1) In order to prevent malfunction in set devices caused by bounce and chattering during the ON-OFF switch operation, please verify the validity of the circuit under actual operating conditions and temperature range.

2) When switching inductive loads (relays, solenoids, buzzers, etc.), an arc absorbing circuit is recommended to protect the contacts.

4. Please verify under actual conditions.

Please be sure to conduct quality verification under actual operating conditions in order to increase reliability during actual use.

5. Switch selection

Please make your selection so that there will be no problems even if the operating characteristics vary up to ±20% from the standard values.

6. Oil-proof and chemical-proof characteristics

The rubber cap swells when exposed to oil and chemicals. The extent of swelling will vary widely depending on the type and amount of oil and chemicals.

Check with the actual oil or chemicals used.

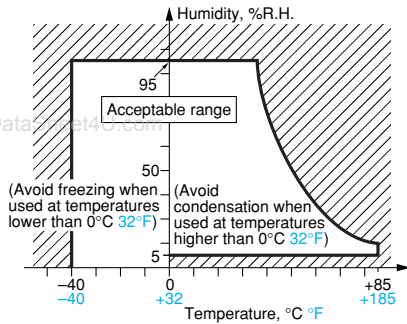
In particular, be aware that solvents such as freon, chlorine, and toluene cannot be used.

## 7. Environment

- Although continuous operation of the switch is possible within the range of ambient temperature (humidity), as the humidity range differs depending on the ambient temperature, the humidity range indicated below should be used.

Continuous use near the limit of the range should be avoided.

- This humidity range does not guarantee permanent performance.



## 8. Other

- 1) Please remember that this switch cannot be used under water. Also, please be warned that switching and sudden temperature changes with the presence of water droplets can cause seepage into the unit.
- 2) Keep away from environments where silicon based adhesives, oil or grease are present as faulty contacts may result from silicon oxide. Do not use in areas where flammable or explosive gases from gasoline and thinner, etc., may be present.
- 3) When using the lever type, please be careful not to apply unreasonable load from the reverse or lateral directions of operation.
- 4) Do not exceed the total travel position (TTP) and press the actuator. This could cause operation failure. Also, when switching at high speed or under shock even within the operation limit, the working life may decrease. Therefore, please be sure to verify the quality under actual conditions of use.
- 5) Please make considerations so that the switch does not become the stopper for the moving part.

**NAIS****MINIATURE SWITCHES  
WITH HIGH PRECISION****QV (AM5)  
SWITCHES**

www.DataSheet4U.com

**FEATURES**

- High precision as a result of designing ideal spring by using computer analysis  
O.P. 14.7±0.4mm .579±.016inch
- Reliable design with shock resistance min. 980 m/s<sup>2</sup> {100 G}
- High inrush resistance 160A
- Wide variety of contact ratings and terminal types
- UL/CSA/VDE/SEMKO approved

**TYPICAL APPLICATION**

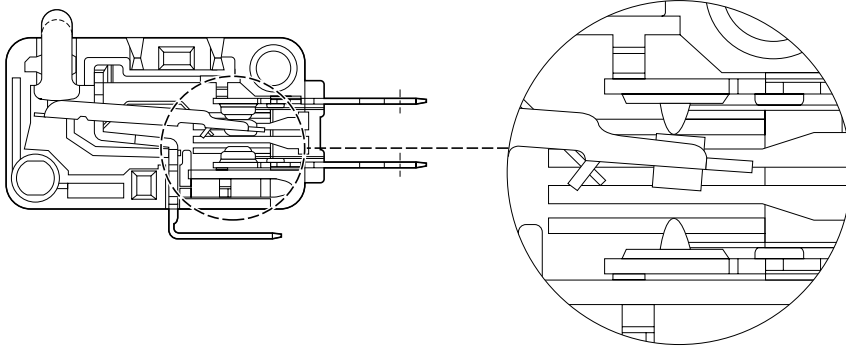
- Home appliances
- Vending machines
- Amusement and communication equipment
- Copiers
- General industrial machines

Standard type contact gap is 1mm .039inch. Please consult us if you need more than 1mm .039inch contact gap.

**CONSTRUCTION**

1. Silver alloy contact

2. Gold clad contact

**ORDERING INFORMATION**

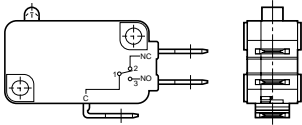
Ex. AM5 0 6 1 0 C 5 R

Type of switch	Contact rating	Terminals	Actuators	Terminals	Operating force by pin plunger (max.)	Guard
AM5: QV switch	00: 0.1 A (Gold clad) 06: 6 A (Silver alloy) 11: 11 A (Silver alloy) 16: 16 A (Silver alloy) 21: 21A (Silver alloy)*	1: Bottom COM, SPDT 2: Bottom COM, SPST-NC 3: Bottom COM, SPST-NO 4: Side COM, SPDT 5: Side COM, SPST-NC 6: Side COM, SPST-NO	0: Pin plunger 1: Short hinge lever 2: Hinge lever 3: Long hinge lever 4: Simulated roller lever 5: Short roller lever 6: Roller lever	(A): .187 Quick-connect/solder terminal) C: .187 Quick-connect terminal D: .250 Quick-connect terminal	1: 0.15 N {15 gf} 2: 0.25 N {25 gf} 3: 0.49 N {50 gf} 4: 0.98 N {100 gf} 5: 1.96 N {200 gf} (6: 2.94 N {300 gf}) 7: 3.92 N {400 gf}	R: Right hand guarded L: Left hand guarded

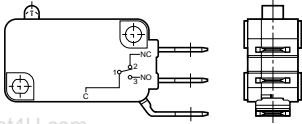
- Remarks: 1. \*21 A type is available only for .250 Quick-connect terminal type.  
2. O.F. 0.15 N {15 gf} and 0.25 N {25 gf} are available for 0.1 A type .187 Quick-connect terminal and .187 Quick-connect terminal.  
3. Not every combination is available. Please refer to the table, "PRODUCT TYPES".  
4. .187 Quick connect/solder terminal and 2.94 N {300 gf} operating force types are custom ordered. Please consult us.  
5. When ordering agency standard approved types, please attach the following number to the part number.  
9: UL/CSA 6 × 10<sup>3</sup> rated  
4: UL/CSA 10<sup>5</sup> rated  
3: UL/CSA 6 × 10<sup>3</sup> rated, VDE and SEMKO approved  
31: UL/CSA 10<sup>5</sup> rated, VDE and SEMKO approved  
8: VDE and SEMKO approved

## TERMINALS

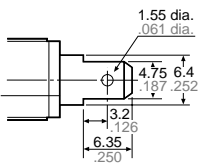
**.187 Quick-connect terminal**  
**.187 Quick-connect/solder terminal**  
 Bottom COM terminal



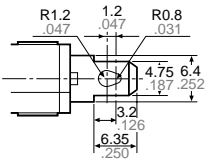
Side COM terminal



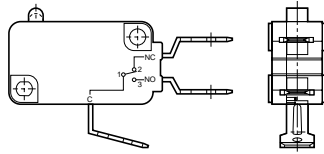
Dimensions  
 .187 Quick-connect terminal



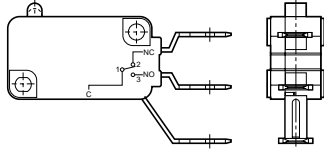
Dimensions  
 .187 Quick-connect/solder terminal



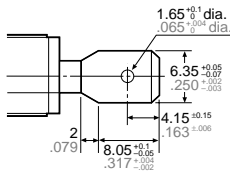
**.250 Quick-connect terminal**  
 Bottom COM terminal



Side COM terminal



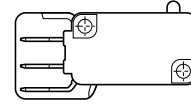
Dimensions



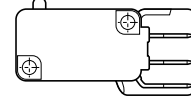
## GUARDS

Guarded types are available only for Side COM terminal type (.187 Quick-connect). All types of bottom COM are not guarded.

Left hand guarded



Right hand guarded



## PRODUCT TYPES

**1. 0.1A type (Gold clad contact)**  
 .187 Quick-connect terminal (Guardless)  
 1) Bottom COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	0.15 N {15 gf}	AM50010C1	AM50020C1	AM50030C1
	0.25 N {25 gf}	AM50010C2	AM50020C2	AM50030C2
	0.49 N {50 gf}	AM50010C3	AM50020C3	AM50030C3
	0.98 N {100 gf}	AM50010C4	AM50020C4	AM50030C4
	1.96 N {200 gf}	AM50010C5	AM50020C5	AM50030C5
Short hinge lever	0.59 N {60 gf}	AM50011C3	AM50021C3	AM50031C3
	1.08 N {110 gf}	AM50011C4	AM50021C4	AM50031C4
	2.16 N {220 gf}	AM50011C5	AM50021C5	AM50031C5
Hinge lever	0.29 N {30 gf}	AM50012C3	AM50022C3	AM50032C3
	0.59 N {60 gf}	AM50012C4	AM50022C4	AM50032C4
	1.18 N {120 gf}	AM50012C5	AM50022C5	AM50032C5
Long hinge lever	0.15 N {15 gf}	AM50013C3	AM50023C3	AM50033C3
	0.29 N {30 gf}	AM50013C4	AM50023C4	AM50033C4
	0.59 N {60 gf}	AM50013C5	AM50023C5	AM50033C5
Simulated roller lever	0.29 N {30 gf}	AM50014C3	AM50024C3	AM50034C3
	0.59 N {60 gf}	AM50014C4	AM50024C4	AM50034C4
	1.18 N {120 gf}	AM50014C5	AM50024C5	AM50034C5
Short roller lever	0.59 N {60 gf}	AM50015C3	AM50025C3	AM50035C3
	1.08 N {110 gf}	AM50015C4	AM50025C4	AM50035C4
	2.16 N {220 gf}	AM50015C5	AM50025C5	AM50035C5
Roller lever	0.29 N {30 gf}	AM50016C3	AM50026C3	AM50036C3
	0.59 N {60 gf}	AM50016C4	AM50026C4	AM50036C4
	1.18 N {120 gf}	AM50016C5	AM50026C5	AM50036C5

# AM5

## 2) Side COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	0.15 N {15 gf}	AM50040C1	AM50050C1	AM50060C1
	0.25 N {25 gf}	AM50040C2	AM50050C2	AM50060C2
	0.49 N {50 gf}	AM50040C3	AM50050C3	AM50060C3
	0.98 N {100 gf}	AM50040C4	AM50050C4	AM50060C4
	1.96 N {200 gf}	AM50040C5	AM50050C5	AM50060C5
Short hinge lever	0.59 N {60 gf}	AM50041C3	AM50051C3	AM50061C3
	1.08 N {110 gf}	AM50041C4	AM50051C4	AM50061C4
	2.16 N {220 gf}	AM50041C5	AM50051C5	AM50061C5
Hinge lever	0.29 N {30 gf}	AM50042C3	AM50052C3	AM50062C3
	0.59 N {60 gf}	AM50042C4	AM50052C4	AM50062C4
	1.18 N {120 gf}	AM50042C5	AM50052C5	AM50062C5
Long hinge lever	0.15 N {15 gf}	AM50043C3	AM50053C3	AM50063C3
	0.29 N {30 gf}	AM50043C4	AM50053C4	AM50063C4
	0.59 N {60 gf}	AM50043C5	AM50053C5	AM50063C5
Simulated roller lever	0.29 N {30 gf}	AM50044C3	AM50054C3	AM50064C3
	0.59 N {60 gf}	AM50044C4	AM50054C4	AM50064C4
	1.18 N {120 gf}	AM50044C5	AM50054C5	AM50064C5
Short roller lever	0.59 N {60 gf}	AM50045C3	AM50055C3	AM50065C3
	1.08 N {110 gf}	AM50045C4	AM50055C4	AM50065C4
	2.16 N {220 gf}	AM50045C5	AM50055C5	AM50065C5
Roller lever	0.29 N {30 gf}	AM50046C3	AM50056C3	AM50066C3
	0.59 N {60 gf}	AM50046C4	AM50056C4	AM50066C4
	1.18 N {120 gf}	AM50046C5	AM50056C5	AM50066C5

Remarks: 1. Regarding side COM terminal types, right hand guarded types and left hand guarded types are available.

When ordering, please attach suffix "R" for right hand guarded types or "L" for left hand guarded types to the part number.

<ex.> Guardless type Right hand guarded type

AM50040C4 → AM50040C4R

2. When ordering agency standard approved types, please attach the following number to the part number.

9: UL/CSA 6 × 10<sup>3</sup> rated

4: UL/CSA 10<sup>5</sup> rated

3: UL/CSA 6 × 10<sup>3</sup> rated, VDE and SEMKO approved

31: UL/CSA 10<sup>5</sup> rated, VDE and SEMKO approved

8: VDE and SEMKO approved

3. Also .187 Quick-connect/solder terminal is available. When ordering, change the eighth digit of part number C to A.

<ex.> .187 Quick-connect terminal .187 Quick-connect/solder terminal

AM50010C4 → AM50010A4

4. .250 Quick-connect terminal is available for opening force, 50gf, 100gf, and 200gf types. When ordering, change the eighth digit of part number C to D.

<ex.> .187 Quick-connect terminal .250 Quick-connect terminal

AM50010C3 → AM50010D3

**2. 6A type (Silver alloy contact)**

.187 Quick-connect terminal (Guardless)

1) Bottom COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	0.49 N {50 gf}	AM50610C3	AM50620C3	AM50630C3
	0.98 N {100 gf}	AM50610C4	AM50620C4	AM50630C4
	1.96 N {200 gf}	AM50610C5	AM50620C5	AM50630C5
	*2.94 N {300 gf}	AM50610C6	AM50620C6	AM50630C6
	3.92 N {400 gf}	AM50610C7	AM50620C7	AM50630C7
Short hinge lever	0.59 N {60 gf}	AM50611C3	AM50621C3	AM50631C3
	1.08 N {110 gf}	AM50611C4	AM50621C4	AM50631C4
	2.16 N {220 gf}	AM50611C5	AM50621C5	AM50631C5
	*3.14 N {320 gf}	AM50611C6	AM50621C6	AM50631C6
	4.12 N {420 gf}	AM50611C7	AM50621C7	AM50631C7
Hinge lever	0.29 N {30 gf}	AM50612C3	AM50622C3	AM50632C3
	0.59 N {60 gf}	AM50612C4	AM50622C4	AM50632C4
	1.18 N {120 gf}	AM50612C5	AM50622C5	AM50632C5
	*1.77 N {180 gf}	AM50612C6	AM50622C6	AM50632C6
	2.35 N {240 gf}	AM50612C7	AM50622C7	AM50632C7
Long hinge lever	0.15 N {15 gf}	AM50613C3	AM50623C3	AM50633C3
	0.29 N {30 gf}	AM50613C4	AM50623C4	AM50633C4
	0.59 N {60 gf}	AM50613C5	AM50623C5	AM50633C5
	*0.88 N {90 gf}	AM50613C6	AM50623C6	AM50633C6
	1.18 N {120 gf}	AM50613C7	AM50623C7	AM50633C7
Simulated roller lever	0.29 N {30 gf}	AM50614C3	AM50624C3	AM50634C3
	0.59 N {60 gf}	AM50614C4	AM50624C4	AM50634C4
	1.18 N {120 gf}	AM50614C5	AM50624C5	AM50634C5
	*1.77 N {180 gf}	AM50614C6	AM50624C6	AM50634C6
	2.35 N {240 gf}	AM50614C7	AM50624C7	AM50634C7
Short roller lever	0.59 N {60 gf}	AM50615C3	AM50625C3	AM50635C3
	1.08 N {110 gf}	AM50615C4	AM50625C4	AM50635C4
	2.16 N {220 gf}	AM50615C5	AM50625C5	AM50635C5
	*3.14 N {320 gf}	AM50615C6	AM50625C6	AM50635C6
	4.12 N {420 gf}	AM50615C7	AM50625C7	AM50635C7
Roller lever	0.29 N {30 gf}	AM50616C3	AM50626C3	AM50636C3
	0.59 N {60 gf}	AM50616C4	AM50626C4	AM50636C4
	1.18 N {120 gf}	AM50616C5	AM50626C5	AM50636C5
	*1.77 N {180 gf}	AM50616C6	AM50626C6	AM50636C6
	2.35 N {240 gf}	AM50616C7	AM50626C7	AM50636C7

Remarks: 1. Regarding side COM terminal types, right hand guarded types and left hand guarded types are available.

When ordering, please attach suffix "R" for right hand guarded types or "L" for left hand guarded types to the part number.

&lt;ex.&gt; Guardless type Right hand guarded type

AM50640C4 → AM50640C4R

2. When ordering agency standard approved types, please attach the following number to the part number.

9: UL/CSA 6 × 10<sup>3</sup> rated4: UL/CSA 10<sup>5</sup> rated3: UL/CSA 6 × 10<sup>3</sup> rated, VDE and SEMKO approved31: UL/CSA 10<sup>5</sup> rated, VDE and SEMKO approved

8: VDE and SEMKO approved

3. Also .187 Quick-connect/solder terminal is available. When ordering, change the eighth digit of part number C to A.

&lt;ex.&gt; .187 Quick-connect terminal .187 Quick-connect/solder terminal

AM50610C4 → AM50610A4

4. \* is a custom order. Please consult us.

5. .250 Quick-connect terminal is available. When ordering, change the eighth digit of part number C to D.

&lt;ex.&gt; .187 Quick-connect terminal .250 Quick-connect terminal

AM50610C3 → AM50610D3

# AM5

## 2) Side COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	0.49 N {50 gf}	AM50640C3	AM50650C3	AM50660C3
	0.98 N {100 gf}	AM50640C4	AM50650C4	AM50660C4
	1.96 N {200 gf}	AM50640C5	AM50650C5	AM50660C5
	*2.94 N {300 gf}	AM50640C6	AM50650C6	AM50660C6
	3.92 N {400 gf}	AM50640C7	AM50650C7	AM50660C7
Short hinge lever	0.59 N {60 gf}	AM50641C3	AM50651C3	AM50661C3
	1.08 N {110 gf}	AM50641C4	AM50651C4	AM50661C4
	2.16 N {220 gf}	AM50641C5	AM50651C5	AM50661C5
	*3.14 N {320 gf}	AM50641C6	AM50651C6	AM50661C6
	4.12 N {420 gf}	AM50641C7	AM50651C7	AM50661C7
Hinge lever	0.29 N {30 gf}	AM50642C3	AM50652C3	AM50662C3
	0.59 N {60 gf}	AM50642C4	AM50652C4	AM50662C4
	1.18 N {120 gf}	AM50642C5	AM50652C5	AM50662C5
	*1.77 N {180 gf}	AM50642C6	AM50652C6	AM50662C6
	2.35 N {240 gf}	AM50642C7	AM50652C7	AM50662C7
Long hinge lever	0.15 N {15 gf}	AM50643C3	AM50653C3	AM50663C3
	0.29 N {30 gf}	AM50643C4	AM50653C4	AM50663C4
	0.59 N {60 gf}	AM50643C5	AM50653C5	AM50663C5
	*0.88 N {90 gf}	AM50643C6	AM50653C6	AM50663C6
	1.18 N {120 gf}	AM50643C7	AM50653C7	AM50663C7
Simulated roller lever	0.29 N {30 gf}	AM50644C3	AM50654C3	AM50664C3
	0.59 N {60 gf}	AM50644C4	AM50654C4	AM50664C4
	1.18 N {120 gf}	AM50644C5	AM50654C5	AM50664C5
	*1.77 N {180 gf}	AM50644C6	AM50654C6	AM50664C6
	2.35 N {240 gf}	AM50644C7	AM50654C7	AM50664C7
Short roller lever	0.59 N {60 gf}	AM50645C3	AM50655C3	AM50665C3
	1.08 N {110 gf}	AM50645C4	AM50655C4	AM50665C4
	2.16 N {220 gf}	AM50645C5	AM50655C5	AM50665C5
	*3.14 N {320 gf}	AM50645C6	AM50655C6	AM50665C6
	4.12 N {420 gf}	AM50645C7	AM50655C7	AM50665C7
Roller lever	0.29 N {30 gf}	AM50646C3	AM50656C3	AM50666C3
	0.59 N {60 gf}	AM50646C4	AM50656C4	AM50666C4
	1.18 N {120 gf}	AM50646C5	AM50656C5	AM50666C5
	*1.77 N {180 gf}	AM50646C6	AM50656C6	AM50666C6
	2.35 N {240 gf}	AM50646C7	AM50656C7	AM50666C7

Remarks: 1. Regarding side COM terminal types, right hand guarded types and left hand guarded types are available.

When ordering, please attach suffix "R" for right hand guarded types or "L" for left hand guarded types to the part number.

<ex.> Guardless type Right hand guarded type

AM50640C4 → AM50640C4R

2. When ordering agency standard approved types, please attach the following number to the part number.

9: UL/CSA 6 × 10<sup>3</sup> rated

4: UL/CSA 10<sup>5</sup> rated

3: UL/CSA 6 × 10<sup>3</sup> rated, VDE and SEMKO approved

31: UL/CSA 10<sup>5</sup> rated, VDE and SEMKO approved

8: VDE and SEMKO approved

3. Also .187 Quick-connect/solder terminal is available. When ordering, change the eighth digit of part number C to A.

<ex.> .187 Quick-connect terminal .187 Quick-connect/solder terminal

AM50610C4 → AM50610A4

4. \* is a custom order. Please consult us.

5. .250 Quick-connect terminal is available. When ordering, change the eighth digit of part number C to D.

<ex.> .187 Quick-connect terminal .250 Quick-connect terminal

AM50610C3 → AM50610D3



**3. 11A type (Silver alloy contact)**

.187 Quick-connect terminal (Guardless)

## 1) Bottom COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	0.98 N {100 gf}	AM51110C4	AM51120C4	AM51130C4
Short hinge lever	1.08 N {110 gf}	AM51111C4	AM51121C4	AM51131C4
Hinge lever	0.59 N {60 gf}	AM51112C4	AM51122C4	AM51132C4
Long hinge lever	0.29 N {30 gf}	AM51113C4	AM51123C4	AM51133C4
Simulated roller lever	0.59 N {60 gf}	AM51114C4	AM51124C4	AM51134C4
Short roller lever	1.08 N {110 gf}	AM51115C4	AM51125C4	AM51135C4
Roller lever	0.59 N {60 gf}	AM51116C4	AM51126C4	AM51136C4

## 2) Side COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	0.98 N {100 gf}	AM51140C4	AM51150C4	AM51160C4
Short hinge lever	1.08 N {110 gf}	AM51141C4	AM51151C4	AM51161C4
Hinge lever	0.59 N {60 gf}	AM51142C4	AM51152C4	AM51162C4
Long hinge lever	0.29 N {30 gf}	AM51143C4	AM51153C4	AM51163C4
Simulated roller lever	0.59 N {60 gf}	AM51144C4	AM51154C4	AM51164C4
Short roller lever	1.08 N {110 gf}	AM51145C4	AM51155C4	AM51165C4
Roller lever	0.59 N {60 gf}	AM51146C4	AM51156C4	AM51166C4

Remarks: 1. Regarding side COM terminal types, right hand guarded types and left hand guarded types are available.

When ordering, please attach suffix "R" for right hand guarded types or "L" for left hand guarded types to the part number.

&lt;ex.&gt; Guardless type Right hand guarded type

AM51140C4 → AM51140C4R

2. When ordering agency standard approved types, please attach the following number to the part number.

9: UL/CSA 6 × 10<sup>3</sup> rated4: UL/CSA 10<sup>5</sup> rated3: UL/CSA 6 × 10<sup>3</sup> rated, VDE and SEMKO approved31: UL/CSA 10<sup>5</sup> rated, VDE and SEMKO approved

8: VDE and SEMKO approved

3. Also .187 Quick-connect/solder terminal is available. When ordering, change the eighth digit of part number C to A.

&lt;ex.&gt; .187 Quick-connect terminal .187 Quick-connect/solder terminal

AM51110C4 → AM51110A4

4. .250 Quick-connect terminal is available. When ordering, change the eighth digit of part number C to D.

&lt;ex.&gt; .187 Quick-connect terminal .250 Quick-connect terminal

AM51110C4 → AM51110D4

**4. 16A type (Silver alloy contact)**

.187 Quick-connect terminal (Guardless)

## 1) Bottom COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	1.96 N {200 gf}	AM51610C5	AM51620C5	AM51630C5
	*2.94 N {300 gf}	AM51610C6	AM51620C6	AM51630C6
	3.92 N {400 gf}	AM51610C7	AM51620C7	AM51630C7
Short hinge lever	2.16 N {220 gf}	AM51611C5	AM51621C5	AM51631C5
	*3.14 N {320 gf}	AM51611C6	AM51621C6	AM51631C6
	4.12 N {420 gf}	AM51611C7	AM51621C7	AM51631C7
Hinge lever	1.18 N {120 gf}	AM51612C5	AM51622C5	AM51632C5
	*1.77 N {180 gf}	AM51612C6	AM51622C6	AM51632C6
	2.35 N {240 gf}	AM51612C7	AM51622C7	AM51632C7
Long hinge lever	0.59 N {60 gf}	AM51613C5	AM51623C5	AM51633C5
	*0.88 N {90 gf}	AM51613C6	AM51623C6	AM51633C6
	1.18 N {120 gf}	AM51613C7	AM51623C7	AM51633C7
Simulated roller lever	1.18 N {120 gf}	AM51614C5	AM51624C5	AM51634C5
	*1.77 N {180 gf}	AM51614C6	AM51624C6	AM51634C6
	2.35 N {240 gf}	AM51614C7	AM51624C7	AM51634C7
Short roller lever	2.16 N {220 gf}	AM51615C5	AM51625C5	AM51635C5
	*3.14 N {320 gf}	AM51615C6	AM51625C6	AM51635C6
	4.12 N {420 gf}	AM51615C7	AM51625C7	AM51635C7
Roller lever	1.18 N {120 gf}	AM51616C5	AM51626C5	AM51636C5
	*1.77 N {180 gf}	AM51616C6	AM51626C6	AM51636C6
	2.35 N {240 gf}	AM51616C7	AM51626C7	AM51636C7

# AM5

## 2) Side COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	1.96 N {200 gf}	AM51640C5	AM51650C5	AM51660C5
	*2.94 N {300 gf}	AM51640C6	AM51650C6	AM51660C6
	3.92 N {400 gf}	AM51640C7	AM51650C7	AM51660C7
Short hinge lever	2.16 N {220 gf}	AM51641C5	AM51651C5	AM51661C5
	*3.14 N {320 gf}	AM51641C6	AM51651C6	AM51661C6
	4.12 N {420 gf}	AM51641C7	AM51651C7	AM51661C7
Hinge lever	1.18 N {120 gf}	AM51642C5	AM51652C5	AM51662C5
	*1.77 N {180 gf}	AM51642C6	AM51652C6	AM51662C6
	2.35 N {240 gf}	AM51642C7	AM51652C7	AM51662C7
Long hinge lever	0.59 N {60 gf}	AM51643C5	AM51653C5	AM51663C5
	*0.88 N {90 gf}	AM51643C6	AM51653C6	AM51663C6
	1.18 N {120 gf}	AM51643C7	AM51653C7	AM51663C7
Simulated roller lever	1.18 N {120 gf}	AM51644C5	AM51654C5	AM51664C5
	*1.77 N {180 gf}	AM51644C6	AM51654C6	AM51664C6
	2.35 N {240 gf}	AM51644C7	AM51654C7	AM51664C7
Short roller lever	2.16 N {220 gf}	AM51645C5	AM51655C5	AM51665C5
	*3.14 N {320 gf}	AM51645C6	AM51655C6	AM51665C6
	4.12 N {420 gf}	AM51645C7	AM51655C7	AM51665C7
Roller lever	1.18 N {120 gf}	AM51646C5	AM51656C5	AM51666C5
	*1.77 N {180 gf}	AM51646C6	AM51656C6	AM51666C6
	2.35 N {240 gf}	AM51646C7	AM51656C7	AM51666C7

Remarks: 1. Regarding side COM terminal types, right hand guarded types and left hand guarded types are available.

When ordering, please attach suffix "R" for right hand guarded types or "L" for left hand guarded types to the part number.

<ex.> Guardless type Right hand guarded type

AM51640C5 → AM51640C5R

2. When ordering agency standard approved types, please attach the following number to the part number.

9: UL/CSA 6 × 10<sup>3</sup> rated

4: UL/CSA 10<sup>3</sup> rated

3: UL/CSA 6 × 10<sup>3</sup> rated, VDE and SEMKO approved

31: UL/CSA 10<sup>3</sup> rated, VDE and SEMKO approved

8: VDE and SEMKO approved

3. Also .187 Quick-connect/solder terminal is available. When ordering, change the eighth digit of part number C to A.

<ex.> .187 Quick-connect terminal .187 Quick-connect/solder terminal

AM51610C5 → AM51610A5

4. \* is a custom ordered product. Please consult us.

5. .250 Quick-connect terminal is available. When ordering, change the eighth digit of part number C to D.

<ex.> .187 Quick-connect terminal .250 Quick-connect terminal

AM51610C5 → AM51610D5

## 5. 21A type (Silver alloy contact)

.250 Quick-connect terminal (Guardless)

### 1) Bottom COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	*2.94 N {300 gf}	AM52110D6	AM52120D6	AM52130D6
	3.92 N {400 gf}	AM52110D7	AM52120D7	AM52130D7
Short hinge lever	*3.14 N {320 gf}	AM52111D6	AM52121D6	AM52131D6
	4.12 N {420 gf}	AM52111D7	AM52121D7	AM52131D7
Hinge lever	*1.77 N {180 gf}	AM52112D6	AM52122D6	AM52132D6
	2.35 N {240 gf}	AM52112D7	AM52122D7	AM52132D7
Long hinge lever	*0.88 N {90 gf}	AM52113D6	AM52123D6	AM52133D6
	1.18 N {120 gf}	AM52113D7	AM52123D7	AM52133D7
Simulated roller lever	*1.77 N {180 gf}	AM52114D6	AM52124D6	AM52134D6
	2.35 N {240 gf}	AM52114D7	AM52124D7	AM52134D7
Short roller lever	*3.14 N {320 gf}	AM52115D6	AM52125D6	AM52135D6
	4.12 N {420 gf}	AM52115D7	AM52125D7	AM52135D7
Roller lever	*1.77 N {180 gf}	AM52116D6	AM52126D6	AM52136D6
	2.35 N {240 gf}	AM52116D7	AM52126D7	AM52136D7

## 2) Side COM terminal

Actuator	Operating force, Max.	Contact arrangement		
		SPDT	SPST-NC	SPST-NO
Pin plunger	*2.94 N {300 gf}	AM52140D6	AM52150D6	AM52160D6
	3.92 N {400 gf}	AM52140D7	AM52150D7	AM52160D7
Short hinge lever	*3.14 N {320 gf}	AM52141D6	AM52151D6	AM52161D6
	4.12 N {420 gf}	AM52141D7	AM52151D7	AM52161D7
Hinge lever	*1.77 N {180 gf}	AM52142D6	AM52152D6	AM52162D6
	2.35 N {240 gf}	AM52142D7	AM52152D7	AM52162D7
Long hinge lever	*0.88 N {90 gf}	AM52143D6	AM52153D6	AM52163D6
	1.18 N {120 gf}	AM52143D7	AM52153D7	AM52163D7
Simulated roller lever	*1.77 N {180 gf}	AM52144D6	AM52154D6	AM52164D6
	2.35 N {240 gf}	AM52144D7	AM52154D7	AM52164D7
Short roller lever	*3.14 N {320 gf}	AM52145D6	AM52155D6	AM52165D6
	4.12 N {420 gf}	AM52145D7	AM52155D7	AM52165D7
Roller lever	*1.77 N {180 gf}	AM52146D6	AM52156D6	AM52166D6
	2.35 N {240 gf}	AM52146D7	AM52156D7	AM52166D7

Remarks: 1. When ordering agency standard approved types, please attach the following number to the part number.

9: UL/CSA  $6 \times 10^3$  rated

4: UL/CSA  $10^5$  rated

3: UL/CSA  $6 \times 10^3$  rated, VDE and SEMKO approved

31: UL/CSA  $10^5$  rated, VDE and SEMKO approved

8: VDE and SEMKO approved

2.\* is a custom ordered product. Please consult us.

## SPECIFICATIONS

### 1. Contact rating

Type		Voltage	Resistive load ( $\cos \phi \approx 1$ )	Inductive load ( $\cos \phi \approx 0.6$ to $0.7$ )
Gold clad contact	0.1A type	250V AC	0.1A	0.1A
		125V AC	0.1A	0.1A
		30V DC	0.1A	0.1A
Silver alloy contact	6A type	250V AC	6A	3A
		125V AC	6A	3A
		125V DC	0.5A	0.5A
	11A type	250V AC	11A	6A
		125V AC	11A	6A
		125V DC	0.6A	0.6A
16A type	250V AC	16A	10A	
	125V AC	16A	10A	
	125V DC	0.6A	0.6A	
21A type	250V AC	21A	16A	
	125V AC	21A	16A	
	125V DC	0.6A	0.6A	
Gold clad contact for low level circuit		6V DC	5mA	—
		12V DC	2mA	—
		24V DC	1mA	—

# AM5

## 2. Characteristics

Type		21A type (Silver alloy)	16, 11, 6A type (Silver alloy)	0.1A type (Gold clad)
Expected life (min.)	Mechanical	10 <sup>7</sup> operations (at 60 cpm)		
	Electrical	10 <sup>5</sup> Operations (at rated load 20 cpm)		10 <sup>5</sup> operations (at rated load) 2 × 10 <sup>6</sup> operations (at low-level circuit rating)
Insulation resistance		100MΩ (at 500V DC)		
Dielectric strength	Between terminals	1,000Vrms for 1 min.		
	Between terminals and other exposed metal parts	2,000Vrms for 1 min.		
	Between terminals and ground	2,000Vrms for 1 min.		
Contact resistance (initial)		50mΩ (by voltage drop at 1A 6 to 8V DC)		50mΩ (by voltage drop at 0.1A 6 to 8V DC)
Vibration resistance (by pin plunger)		10 to 55Hz at simple amplitude of 0.75mm (Contact opening: max. 1msec.)		
Shock resistance (by pin plunger) (contact opening: max. 1msec.)		Min. 294 m/s <sup>2</sup> {30 G}	O.F. 0.49 N {50 gf} max. type Min. 98 m/s <sup>2</sup> {10 G} O.F. 0.98 N {100 gf} max. type Min. 196 m/s <sup>2</sup> {20 G} O.F. 1.96 N {200 gf} to 3.92 N {400 gf} max. type Min. 294 m/s <sup>2</sup> {30 G}	O.F. 0.15 N {15 gf} to 0.49 N {50 gf} max. type Min. 98 m/s <sup>2</sup> {10 G} O.F. 0.98 N {100 gf} max. type Min. 196 m/s <sup>2</sup> {20 G} O.F. 1.96 N {200 gf} max. type Min. 294 m/s <sup>2</sup> {30 G}
Allowable operating speed		0.1 to 1,000mm/sec. (at pin plunger)		
Maximum operating cycle rate		600cpm		O.F. 0.15 N {15 gf}, 0.25 N {25 gf} max. type: 300cpm Other O.F. types: 600cpm
Ambient temperature		-25 to +105°C -13 to +221°F (Not freezing below 0°C 32°F)		
Ambient humidity		Max. 85% R.H.		
Weight		6.3g .222oz		

## 3. Operating characteristics

### Pin plunger

7th digit of part No.	1	2	3	4	5	6	7
Operating force, max.	0.15 N {15 gf}	0.25 N {25 gf}	0.49 N {50 gf}	0.98 N {100 gf}	1.96 N {200 gf}	2.94 N {300 gf}	3.92 N {400 gf}
Release force, min.	0.029 N {3 gf}	0.059 N {6 gf}	0.12 N {12 gf}	0.25 N {25 gf}	0.49 N {50 gf}	0.74 N {75 gf}	0.98 N {100 gf}
Pretravel, max. mm inch	1.6 .063		1.4 .055				
Movement differential, max. mm inch	0.8 .031		0.4 .016				
Overtravel, min. mm inch	0.8 .031		1.0 .039				
Operating position mm inch	14.7±0.6 .579±.024		14.7±0.4 .579±.016				

### Short hinge lever

7th digit of part No.	3	4	5	6	7
Operating force, max.	0.59 N {60 gf}	1.08 N {110 gf}	2.16 N {220 gf}	3.14 N {320 gf}	4.12 N {420 gf}
Release force, min.	0.098 N {10 gf}	0.20 N {20 gf}	0.39 N {40 gf}	0.59 N {60 gf}	0.78 N {80 gf}
Pretravel, max. mm inch	1.6 .063				
Movement differential, max. mm inch	0.5 .020				
Overtravel, min. mm inch	0.9 .035				
Operating position mm inch	15.3±0.5 .602±.020				

### Hinge lever

7th digit of part No.	3	4	5	6	7
Operating force, max.	0.29 N {30 gf}	0.59 N {60 gf}	1.18 N {120 gf}	1.77 N {180 gf}	2.35 N {240 gf}
Release force, min.	0.049 N {5 gf}	0.098 N {10 gf}	0.20 N {20 gf}	0.29 N {30 gf}	0.39 N {40 gf}
Pretravel, max. mm inch	3.2 .126				
Movement differential, max. mm inch	1.0 .039				
Overtravel, min. mm inch	1.4 .055				
Operating position mm inch	15.3±1.0 .602±.039				

### Long hinge lever

7th digit of part No.	3	4	5	6	7
Operating force, max.	0.15 N {15 gf}	0.29 N {30 gf}	0.59 N {60 gf}	0.88 N {90 gf}	1.18 N {120 gf}
Release force, min.	0.025 N {2.5 gf}	0.049 N {5 gf}	0.098 N {10 gf}	0.15 N {15 gf}	0.20 N {20 gf}
Pretravel, max. mm inch	7.5 .295				
Movement differential, max. mm inch	2.0 .079				
Overtravel, min. mm inch	2.2 .087				
Operating position mm inch	15.3±2.6 .602±.102				

## Simulated roller lever

7th digit of part No.	3	4	5	6	7
Operating force, max.	0.29 N {30 gf}	0.59 N {60 gf}	1.18 N {120 gf}	1.77 N {180 gf}	2.35 N {240 gf}
Release force, min.	0.049 N {5 gf}	0.098 N {10 gf}	0.20 N {20 gf}	0.29 N {30 gf}	0.39 N {40 gf}
Pretravel, max. mm inch	3.2 .126				
Movement differential, max. mm inch	1.0 .039				
Overtravel, min. mm inch	1.4 .055				
Operating position mm inch	18.5±1.0 .728±.039				

## Short roller lever

7th digit of part No.	3	4	5	6	7
Operating force, max.	0.59 N {60 gf}	1.08 N {110 gf}	2.16 N {220 gf}	3.14 N {320 gf}	4.12 N {420 gf}
Release force, min.	0.098 N {10 gf}	0.20 N {20 gf}	0.39 N {40 gf}	0.59 N {60 gf}	0.78 N {80 gf}
Pretravel, max. mm inch	1.6 .063				
Movement differential, max. mm inch	0.5 .020				
Overtravel, min. mm inch	0.9 .035				
Operating position mm inch	20.7±0.5 .815±.020				

## Roller lever

7th digit of part No.	3	4	5	6	7
Operating force, max.	0.29 N {30 gf}	0.59 N {60 gf}	1.18 N {120 gf}	1.77 N {180 gf}	2.35 N {240 gf}
Release force, min.	0.049 N {5 gf}	0.098 N {10 gf}	0.20 N {20 gf}	0.29 N {30 gf}	0.39 N {40 gf}
Pretravel, max. mm inch	3.2 .126				
Movement differential, max. mm inch	1.0 .039				
Overtravel, min. mm inch	1.4 .055				
Operating position mm inch	20.7±1.0 .815±.039				

## DIMENSIONS

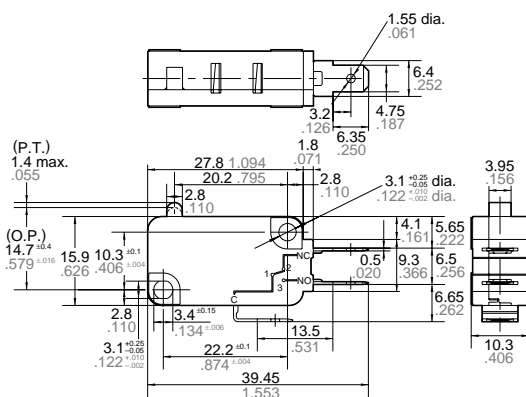
mm inch General tolerance: ±0.25 ±.010

### 1. Pin plunger

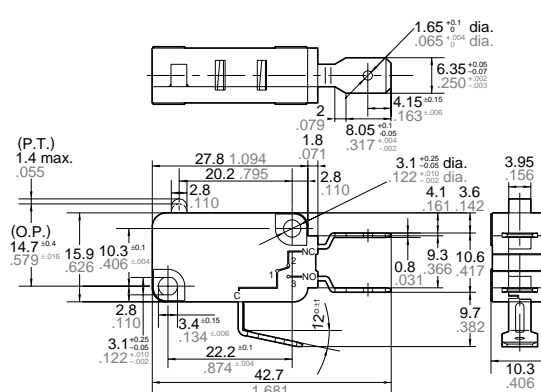
Bottom COM terminal  
(Guardless)



.187 Quick-connect terminal

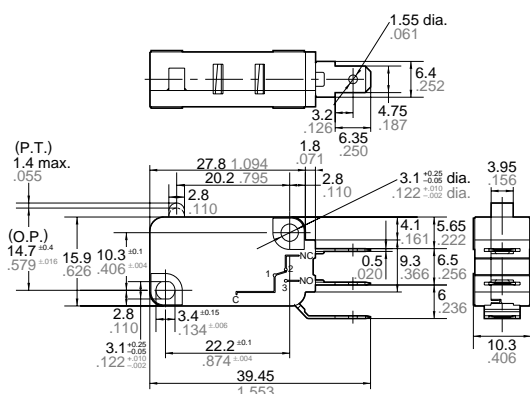


.250 Quick-connect terminal

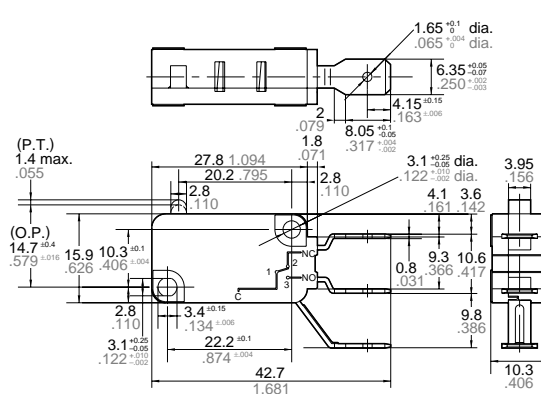


Side COM terminal  
(Guardless)

.187 Quick-connect terminal



.250 Quick-connect terminal

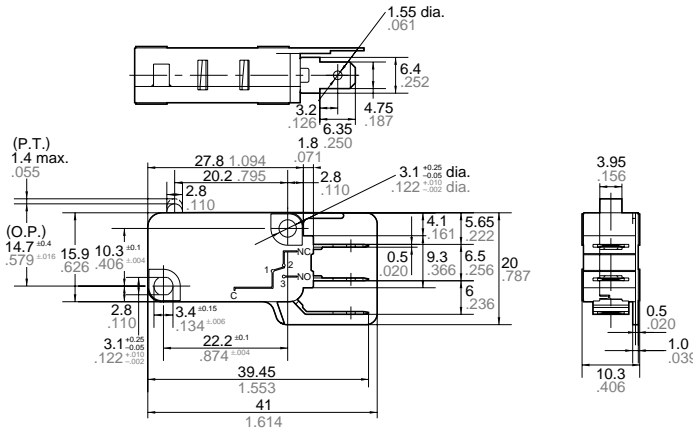


# AM5

Side COM terminal  
(Right hand guarded)

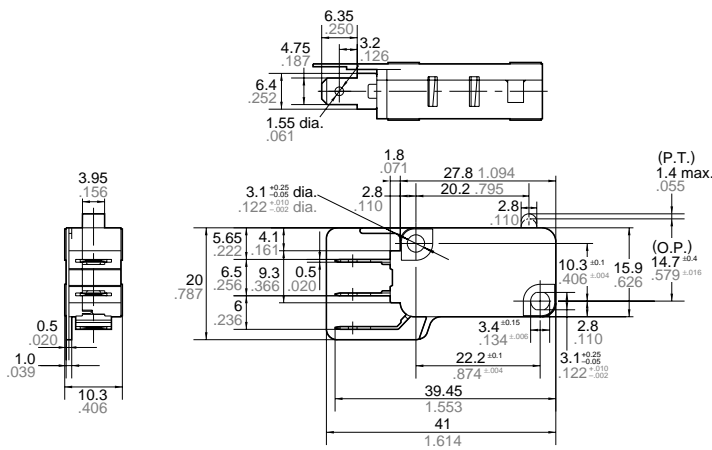
mm inch General tolerance:  $\pm 0.25 \pm 0.10$

.187 Quick-connect terminal



Side COM terminal  
(Left hand guarded)

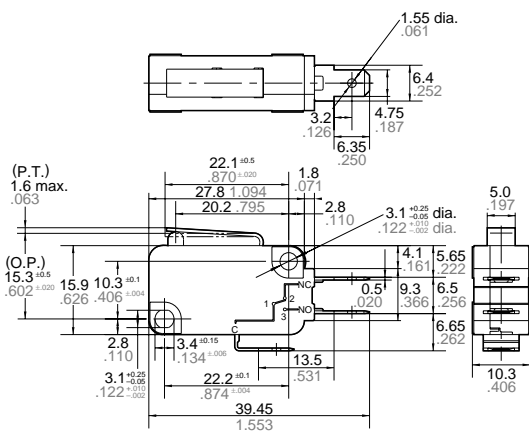
.187 Quick-connect terminal



## Pin plunger characteristic chart

	●	●	●	●	●	—	—
0.1A type	●	—	—	—	—	—	—
6A type	—	—	●	●	●	●	●
11A type	—	—	—	●	—	—	—
16A type	—	—	—	—	●	●	●
21A type	—	—	—	—	—	●	●
7th digit of part No.	1	2	3	4	5	6	7
Operating force, max.	0.15 N {15 gf}	0.25 N {25 gf}	0.49 N {50 gf}	0.98 N {100 gf}	1.96 N {200 gf}	2.94 N {300 gf}	3.92 N {400 gf}
Release force, min.	0.029 N {3 gf}	0.059 N {6 gf}	0.12 N {12 gf}	0.25 N {25 gf}	0.49 N {50 gf}	0.74 N {75 gf}	0.98 N {100 gf}
Pretravel, max. mm inch	1.6 .063				1.4 .055		
Movement differential, max. mm inch	0.8 .031				0.4 .016		
Overtravel, min. mm inch	0.8 .031				1.0 .039		
Operating position mm inch	14.7±0.6 .579±.024				14.7±0.4 .579±.016		

## 2. Short hinge lever

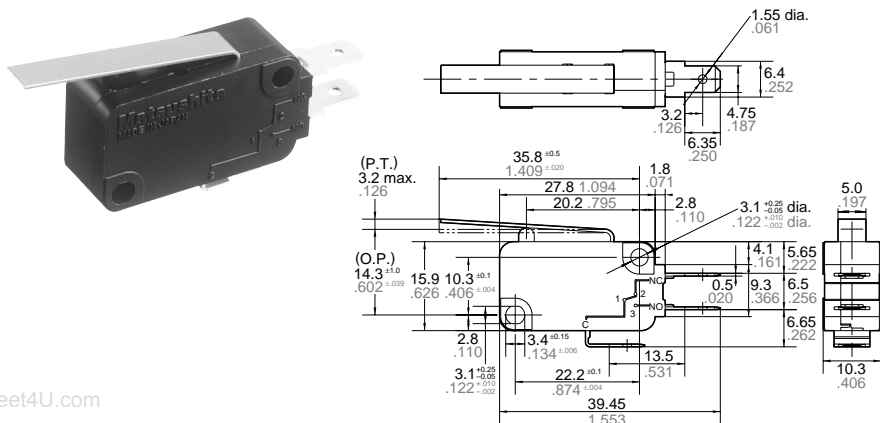


	●	●	●	—	—
0.1A type	●	●	●	—	—
6A type	●	●	●	●	●
11A type	—	●	—	—	—
16A type	—	—	●	●	●
21A type	—	—	—	●	●
7th digit of part No.	3	4	5	6	7
Operating force, Max.	0.59 N {60 gf}	1.08 N {110 gf}	2.16 N {220 gf}	3.14 N {320 gf}	4.12 N {420 gf}
Release force, Min.	0.098 N {10 gf}	0.20 N {20 gf}	0.39 N {40 gf}	0.59 N {60 gf}	0.78 N {80 gf}
Pretravel, max. mm inch	1.6 .063				
Movement differential, max. mm inch	0.5 .020				
Overtravel, min. mm inch	0.9 .035				
Operating position mm inch	15.3±0.5 .602±.020				

The dimensions other than drawn above are same as pin plunger type.

3. Hinge lever

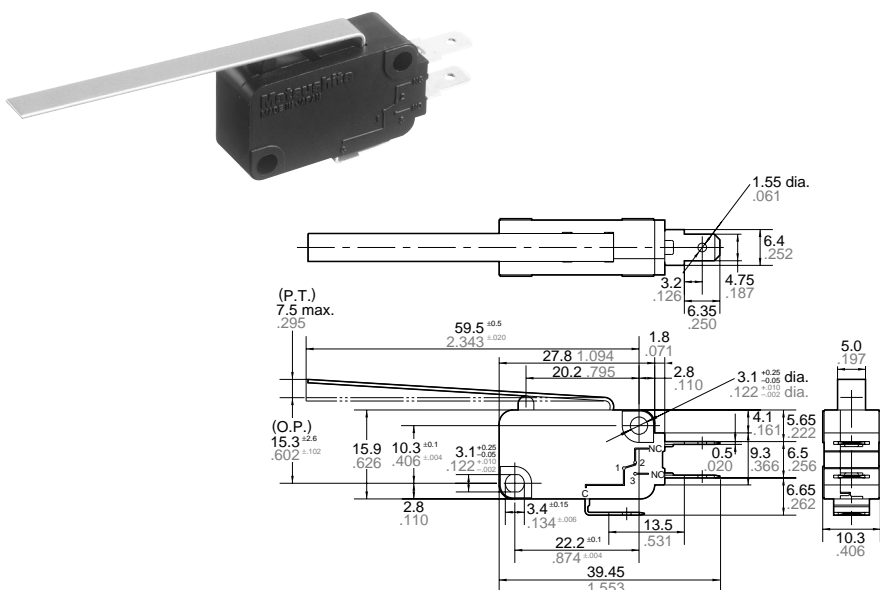
mm inch General tolerance:  $\pm 0.25 \pm .010$



0.1A type	●	●	●	—	—
6A type	●	●	●	●	●
11A type	—	●	—	—	—
16A type	—	—	●	●	●
21A type	—	—	—	●	●
7th digit of part No.	3	4	5	6	7
Operating force, Max.	0.29 N (30 gf)	0.59 N (60 gf)	1.18 N (120 gf)	1.77 N (180 gf)	2.35 N (240 gf)
Release force, Min.	0.049 N (5 gf)	0.098 N (10 gf)	0.20 N (20 gf)	0.29 N (30 gf)	0.39 N (40 gf)
Pretravel, max. mm inch	3.2 .126				
Movement differential, max. mm inch	1.0 .039				
Overtravel, min. mm inch	1.4 .055				
Operating position mm inch	15.3±1.0 .602±.039				

The dimensions other than drawn above are same as pin plunger type.

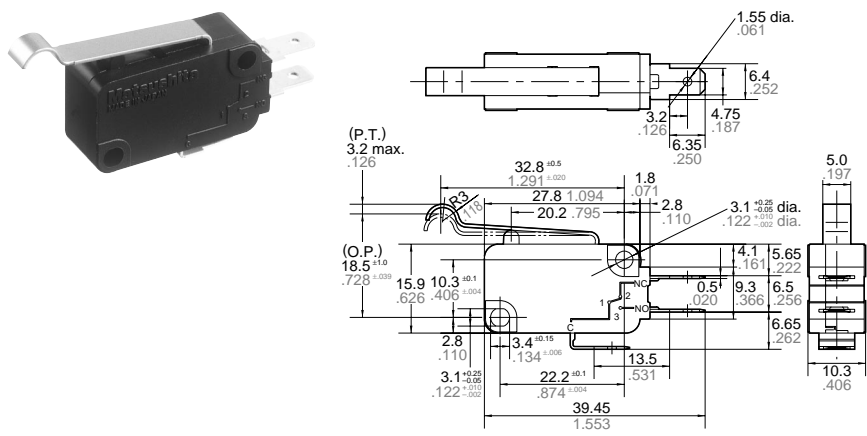
4. Long hinge lever



0.1A type	●	●	●	—	—
6A type	●	●	●	●	●
11A type	—	●	—	—	—
16A type	—	—	●	●	●
21A type	—	—	—	●	●
7th digit of part No.	3	4	5	6	7
Operating force, Max.	0.15 N (15 gf)	0.29 N (30 gf)	0.59 N (60 gf)	0.88 N (90 gf)	1.18 N (120 gf)
Release force, Min.	0.025 N (2.5 gf)	0.049 N (5 gf)	0.098 N (10 gf)	0.15 N (15 gf)	0.20 N (20 gf)
Pretravel, max. mm inch	7.5 .295				
Movement differential, max. mm inch	2.0 .079				
Overtravel, min. mm inch	2.2 .087				
Operating position mm inch	15.3±2.6 .602±.102				

The dimensions other than drawn above are same as pin plunger type.

5. Simulated roller lever

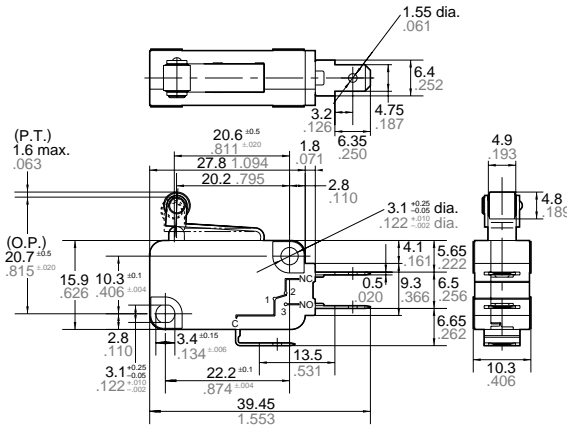


0.1A type	●	●	●	—	—
6A type	●	●	●	●	●
11A type	—	●	—	—	—
16A type	—	—	●	●	●
21A type	—	—	—	●	●
7th digit of part No.	3	4	5	6	7
Operating force, Max.	0.29 N (30 gf)	0.59 N (60 gf)	1.18 N (120 gf)	1.77 N (180 gf)	2.35 N (240 gf)
Release force, Min.	0.049 N (5 gf)	0.098 N (10 gf)	0.20 N (20 gf)	0.29 N (30 gf)	0.39 N (40 gf)
Pretravel, max. mm inch	3.2 .126				
Movement differential, max. mm inch	1.0 .039				
Overtravel, min. mm inch	1.4 .055				
Operating position mm inch	18.5±1.0 .728±.039				

The dimensions other than drawn above are same as pin plunger type.

# AM5

## 6. Short roller lever

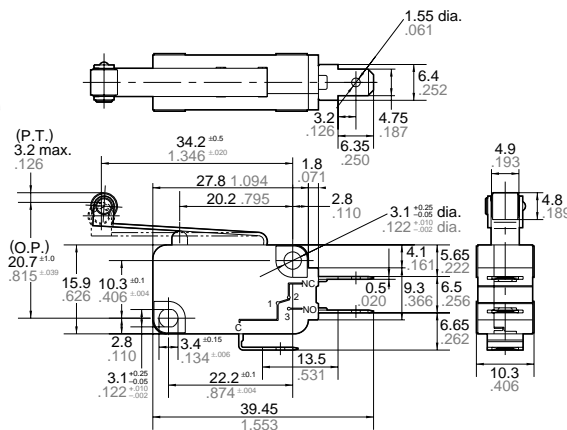


The dimensions other than drawn above are same as pin plunger type.

mm inch General tolerance:  $\pm 0.25 \pm 0.10$

0.1A type	●	●	●	—	—
6A type	●	●	●	●	●
11A type	—	●	—	—	—
16A type	—	—	●	●	●
21A type	—	—	—	●	●
7th digit of part No.	3	4	5	6	7
Operating force, Max.	0.59 N (60 gf)	1.08 N (110 gf)	2.16 N (220 gf)	3.14 N (320 gf)	4.12 N (420 gf)
Release force, Min.	0.098 N (10 gf)	0.20 N (20 gf)	0.39 N (40 gf)	0.59 N (60 gf)	0.78 N (80 gf)
Pretravel, max. mm inch	1.6 .063				
Movement differential, max. mm inch	0.5 .020				
Overtravel, min. mm inch	0.9 .035				
Operating position mm inch	20.7 $\pm$ 0.5 .815 $\pm$ .020				

## 7. Hinge Roller lever



The dimensions other than drawn above are same as pin plunger type.

0.1A type	●	●	●	—	—
6A type	●	●	●	●	●
11A type	—	●	—	—	—
16A type	—	—	●	●	●
21A type	—	—	—	●	●
7th digit of part No.	3	4	5	6	7
Operating force, Max.	0.29 N (30 gf)	0.59 N (60 gf)	1.18 N (120 gf)	1.77 N (180 gf)	2.35 N (240 gf)
Release force, Min.	0.049 N (5 gf)	0.098 N (10 gf)	0.20 N (20 gf)	0.29 N (30 gf)	0.39 N (40 gf)
Pretravel, max. mm inch	3.2 .126				
Movement differential, max. mm inch	1.0 .039				
Overtravel, min. mm inch	1.4 .055				
Operating position mm inch	20.7 $\pm$ 1.0 .815 $\pm$ .039				

## NOTES

### 1. Fastening of the switch body

- 1) Use flat filister head M3 screws to mount switches with less than a 5kg-cm torque. Use of screws washers or adhesive lock is recommended to prevent loosening of the screws.
- 2) Check insulation distance between ground and each terminal.
- 3) When the operation object is in the free position, force should not be applied directly to the actuator or pin plunger. Also force should be applied to the pin plunger from vertical direction to the switch.
- 4) The standard value of overtravel should be the range of 70% to 100% of the rated O.T. value.

### 2. Soldering operations

Soldering should be accomplished in less than 5 seconds, with a 60 watt iron. Care should be taken not to apply force to the terminal during soldering.

### 3. Variance of operating characteristics

When specifying the switch, allow +20% to the listed operating and release forces.

### 4. Environment

Avoid using the switches in the following conditions;

- In corrosive gases, such as silicon gas
- In a dusty environment

### 5. For switching of inductive loads (relays, solenoids, etc.)

- 1) In order to prevent damage to contacts due to the occurrence of arcing, an arc absorbing circuit should be applied.
- 2) Care should be taken that occurrence in AC load possibly shorten the expected life.

### 6. Please assure the quality and reliability of the switch under the actual service condition.

**7. Wire lever and other light actuators are suitable for the types of O.F. 0.15 N {15 gf} and 0.25 N {25gf} (pin plunger)**  
Select the actuator with consideration of applied shock around mounting place and mounting direction.

### 8. It is recommended to use Gold clad contact type in use of low-level circuit rating.

**9. Cover and body are press-fitted. Once it is taken apart, it may cause change of characteristics.**

## USE OF CONNECTOR

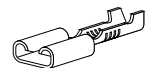
The .187 Quick-connect terminal and .250 Quick-connect terminal accept the all kinds of 1 polarity connectors and the "Positive Lock" connectors (AMP Co., Ltd.)

Please contact the manufacturers directly.

### • receptacle terminal

.250 series

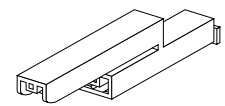
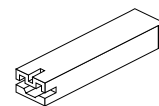
.187 series



### • "Positive Lock" connector AMP Co., Ltd. (equipped with the lock construction of low insertion type)

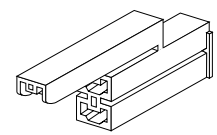
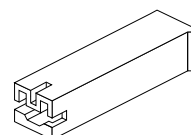
.187 type (1 polarity)

.187 type (2 polarities)



.250 type (1 polarity)

.187 type (3 polarities)





**NAIS**

**MINIATURE SWITCHES  
WITH HIGH PRECISION**  
(Contact gap: more than  
1mm .039inch type)

**QV (AM5)  
SWITCHES**

www.DataSheet4U.com

- Conforms with the IEC950 standards for secondary circuit insulation distance.  
Assures a contact gap of at least 1mm .039inch
- Can handle high-capacity loads on the secondary side that S-type size switches cannot
- High inrush and hard impacts resistant
- Excellent operating position precision
- UL/CSA/VDE/SEMKO approved

## PRODUCT TYPES

Contact rating: 0.1A, 6A, 11A, 16A (250V AC)

Terminal shape: .187 Quick connect terminal, .187 Quick connect/solder terminal

For other specifications, please consult us.

## DIMENSIONS AND NOTES

Please refer to Standard QV switches catalog for dimensions and notes.

## SPECIFICATIONS

### • Contact ratings (0.1 to 16 A)

Voltage	Resistive load ( $\cos \phi = 1.0$ )				Inductive load ( $\cos \phi \approx 0.6$ to 0.7)			
	0.1A	6A	11A	16A	0.1A	6A	11A	16A
Type	0.1A	6A	11A	16A	0.1A	6A	11A	16A
250V AC	0.1A	6A	11A	16A	0.1A	3A	6A	10A
125V AC	0.1A	6A	11A	16A	0.1A	3A	6A	10A
125V DC	0.1A	0.5A	0.6A	0.6A	0.1A	0.5A	0.6A	0.6A

Remark: The inductive load for DC should have a time constant of 7 ms or less.

### • Low-level circuit type

- DC 6V 5mA (Resistive load)
- DC 12V 2mA (Resistive load)
- DC 24V 1mA (Resistive load)

Please consult us for further information.

# NAIS

## NEW SUBMINIATURE SWITCHES WITH HIGH PRECISION

## FS•FS-T (AV) SWITCHES



FS



FS-T

www.DataSheet4U.com

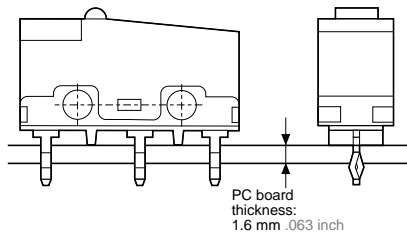
### FEATURES

- New additions: FS-T Cross-line terminal types Gold-clad double layer types exclusively for low-level circuits
- Consistent quality and high precision through sophisticated automatic fabrication system —O.P.:  $8.4 \pm 0.3$  mm  $.331 \pm .012$  inch (O.P.of conventional subminiature switches:  $8.4 \pm 0.5$   $.331 \pm .020$ )
- Flux-resistant construction with integrally molded terminals
- Solder terminal; Self-standing, internationally common pitch, right angle, left angle terminals for PC board; Quick connect .110 terminals for easy mounting
- Insulation guard available for safety mounting

- 2 lever pivot positions available for applications where low operating force is required
- UL/CSA/VDE/SEMKO approved (As for gold-clad double layer, VDE and SEMKO are not approved)

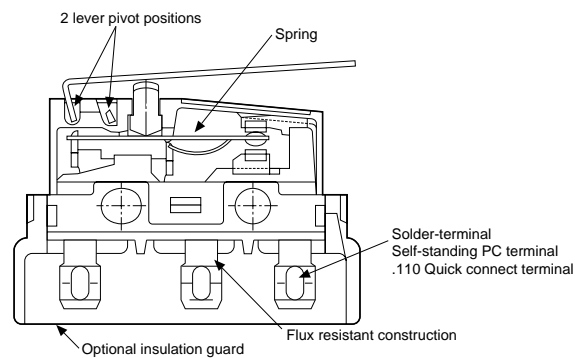
### TYPICAL APPLICATIONS

- Communication equipment
- Vending machines
- Security systems
- Data systems
- Medical equipment
- Cassette tape recorders
- VCR

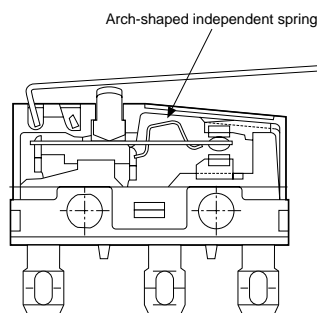


### CONSTRUCTION (Example: AV3/AVM3 type)

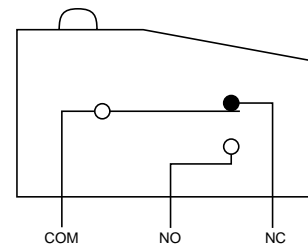
Standard version



Long life version



### SCHEMATIC



Remark: As for FS-T switches, the terminals are the different shape.

**ORDERING INFORMATION**

1.FS switches

Ex. AV 3 2 0 2

Type of switch	Version	Terminals	Actuators	Operating force by pin plunger, max.	Lever position	Contacts
FS•FS-T switch	3: Standard M3: Long life	1: Self-standing solder terminal with guard 2: Self-standing solder terminal without guard 3: Self-standing solder terminal with opposite side guard 4: Self-standing PC terminal (5: Internationally common pitch PC terminal) (6: Right angle terminal) (7: Left angle terminal) 8: .110 Quick-connect terminal	0: Pin plunger 1: Short hinge lever 2: Hinge lever 3: Long hinge lever 4: Simulated roller lever 5: Roller lever	Standard version: 0: 0.25 N {25 gf} 2: 0.49 N {50 gf} 4: 0.98 N {100 gf}  Long life version: 5: 1.47 N {150 gf}	Nil: Standard [11: forward]	Nil: Standard type 61: Gold-clad triple layer 64: Gold-clad double layer type exclusively for low-level circuits

2.FS-T switches

Ex. AV T3 2 0 2

Type of switch	Version	Terminals	Actuators	Operating force by pin plunger, max.	Lever position	Contacts
FS•FS-T switch	T3: Standard L3: Long life	2: Solder terminal 4: PC terminal 8: .110 Quick-connect terminal	0: Pin plunger 1: Short hinge lever 2: Hinge lever 3: Long hinge lever 4: Simulated roller lever 5: Roller lever	Standard version: 0: 0.25 N {25 gf} 2: 0.49 N {50 gf} 4: 0.98 N {100 gf}  Long life version: 5: 1.47 N {150 gf}	Nil: Standard [11: forward]	Nil: Standard type (Not applicable to 25 gf type) 61: Gold-clad triple layer 64: Gold-clad double layer type exclusively for low-level circuits

**APPLICABLE CURRENT RANGE**

Type	Contact	Rating				O.F.			
		1mA	100mA	3A	5A	0.25 N {25 gf}	0.49 N {50 gf}	0.98 N {100 gf}	1.47 N {150 gf}
Standard version	Silver alloy contact		■				●	●	
	Gold-clad triple layer contact type	■				●	●	●	
	Gold-clad double layer contact type	■				●	●	●	
Long life version	Silver alloy contact		■						●
	Gold-clad triple layer contact type	■							●
	Gold-clad double layer contact type	■							●

Remark: For high capacity contact rating up to 10.1 A, please refer to PS (AVM3□□□P) switches catalog.

# AV3,AVM3/AVT3,AVL3

## PRODUCT TYPES

### 1.FS switches (In-line terminal type)

Standard type

	Actuator	Operating force, Max.	Part No.					
			Self-standing solder terminal			Self-standing PC terminal	.110 Quick-connect terminal	
			Without guard	With guard	With opposite side guard			
Silver alloy contact type	Pin plunger	0.49 N {50 gf}	AV3202	AV3102	AV3302	AV3402	AV3802	
		0.98 N {100 gf}	AV3204	AV3104	AV3304	AV3404	AV3804	
	Short hinge lever	0.20 N {20 gf}	AV3212	AV3112	AV3312	AV3412	AV3812	
		0.39 N {40 gf}	AV3214	AV3114	AV3314	AV3414	AV3814	
	Hinge lever	0.16 N {16 gf}	AV3222	AV3122	AV3322	AV3422	AV3822	
		0.34 N {35 gf}	AV3224	AV3124	AV3324	AV3424	AV3824	
	Long hinge lever	0.12 N {12 gf}	AV3232	AV3132	AV3332	AV3432	AV3832	
		0.25 N {25 gf}	AV3234	AV3134	AV3334	AV3434	AV3834	
	Simulated roller lever	0.16 N {16 gf}	AV3242	AV3142	AV3342	AV3442	AV3842	
		0.34 N {35 gf}	AV3244	AV3144	AV3344	AV3444	AV3844	
	Roller lever	0.20 N {20 gf}	AV3252	AV3152	AV3352	AV3452	AV3852	
		0.39 N {40 gf}	AV3254	AV3154	AV3354	AV3454	AV3854	
Gold-clad triple layer contact type	Pin plunger	0.25 N {25 gf}	AV320061	AV310061	AV330061	AV340061	AV380061	
		0.49 N {50 gf}	AV320261	AV310261	AV330261	AV340261	AV380261	
		0.98 N {100 gf}	AV320461	AV310461	AV330461	AV340461	AV380461	
	Short hinge lever	0.098 N {10 gf}	AV321061	AV311061	AV331061	AV341061	AV381061	
		0.20 N {20 gf}	AV321261	AV311261	AV331261	AV341261	AV381261	
		0.39 N {40 gf}	AV321461	AV311461	AV331461	AV341461	AV381461	
	Hinge lever	0.078 N {8 gf}	AV322061	AV312061	AV332061	AV342061	AV382061	
		0.16 N {16 gf}	AV322261	AV312261	AV332261	AV342261	AV382261	
		0.34 N {35 gf}	AV322461	AV312461	AV332461	AV342461	AV382461	
	Long hinge lever	0.12 N {12 gf}	AV323261	AV313261	AV333261	AV343261	AV383261	
		0.25 N {25 gf}	AV323461	AV313461	AV333461	AV343461	AV383461	
	Simulated roller lever	0.16 N {16 gf}	AV324261	AV314261	AV334261	AV344261	AV384261	
		0.34 N {35 gf}	AV324461	AV314461	AV334461	AV344461	AV384461	
	Roller lever	0.20 N {20 gf}	AV325261	AV315261	AV335261	AV345261	AV385261	
		0.39 N {40 gf}	AV325461	AV315461	AV335461	AV345461	AV385461	
	Gold-clad double layer type exclusively for low-level circuits	Pin plunger	0.25 N {25 gf}	AV320064	AV310064	AV330064	AV340064	AV380064
			0.49 N {50 gf}	AV320264	AV310264	AV330264	AV340264	AV380264
			0.98 N {100 gf}	AV320464	AV310464	AV330464	AV340464	AV380464
Short hinge lever		0.098 N {10 gf}	AV321064	AV311064	AV331064	AV341064	AV381064	
		0.20 N {20 gf}	AV321264	AV311264	AV331264	AV341264	AV381264	
		0.39 N {40 gf}	AV321464	AV311464	AV331464	AV341464	AV381464	
Hinge lever		0.078 N {8 gf}	AV322064	AV312064	AV332064	AV342064	AV382064	
		0.16 N {16 gf}	AV322264	AV312264	AV332264	AV342264	AV382264	
		0.34 N {35 gf}	AV322464	AV312464	AV332464	AV342464	AV382464	
Long hinge lever		0.12 N {12 gf}	AV323264	AV313264	AV333264	AV343264	AV383264	
		0.25 N {25 gf}	AV323464	AV313464	AV333464	AV343464	AV383464	
Simulated roller lever		0.16 N {16 gf}	AV324264	AV314264	AV334264	AV344264	AV384264	
		0.34 N {35 gf}	AV324464	AV314464	AV334464	AV344464	AV384464	
Roller lever		0.20 N {20 gf}	AV325264	AV315264	AV335264	AV345264	AV385264	
		0.39 N {40 gf}	AV325464	AV315464	AV335464	AV345464	AV385464	

Remark: When ordering, please refer to "Remarks" of ordering information.

**2.FS-T switches (Cross-line terminal type)**

Standard type

	Actuator	Operating force, Max.	Part No.			
			Solder terminal without guard	PC terminal	.110 Quick-connect terminal	
Silver alloy contact type	Pin plunger	0.49 N {50 gf}	AVT3202	AVT3402	AVT3802	
		0.98 N {100 gf}	AVT3204	AVT3404	AVT3804	
	Short hinge lever	0.20 N {20 gf}	AVT3212	AVT3412	AVT3812	
		0.39 N {40 gf}	AVT3214	AVT3414	AVT3814	
	Hinge lever	0.16 N {16 gf}	AVT3222	AVT3422	AVT3822	
		0.34 N {35 gf}	AVT3224	AVT3424	AVT3824	
	Long hinge lever	0.12 N {12 gf}	AVT3232	AVT3432	AVT3832	
		0.25 N {25 gf}	AVT3234	AVT3434	AVT3834	
	Simulated roller lever	0.16 N {16 gf}	AVT3242	AVT3442	AVT3842	
		0.34 N {35 gf}	AVT3244	AVT3444	AVT3844	
	Roller lever	0.20 N {20 gf}	AVT3252	AVT3452	AVT3852	
		0.39 N {40 gf}	AVT3254	AVT3454	AVT3854	
Gold-clad triple layer contact type	Pin plunger	0.25 N {25 gf}	AVT320061	AVT340061	AVT380061	
		0.49 N {50 gf}	AVT320261	AVT340261	AVT380261	
		0.98 N {100 gf}	AVT320461	AVT340461	AVT380461	
	Short hinge lever	0.098 N {10 gf}	AVT321061	AVT341061	AVT381061	
		0.20 N {20 gf}	AVT321261	AVT341261	AVT381261	
		0.39 N {40 gf}	AVT321461	AVT341461	AVT381461	
	Hinge lever	0.078 N {8 gf}	AVT322061	AVT342061	AVT382061	
		0.16 N {16 gf}	AVT322261	AVT342261	AVT382261	
		0.34 N {35 gf}	AVT322461	AVT342461	AVT382461	
	Long hinge lever	0.12 N {12 gf}	AVT323261	AVT343261	AVT383261	
		0.25 N {25 gf}	AVT323461	AVT343461	AVT383461	
	Simulated roller lever	0.16 N {16 gf}	AVT324261	AVT344261	AVT384261	
		0.34 N {35 gf}	AVT324461	AVT344461	AVT384461	
	Roller lever	0.20 N {20 gf}	AVT325261	AVT345261	AVT385261	
		0.39 N {40 gf}	AVT325461	AVT345461	AVT385461	
	Gold-clad double layer type exclusively for low-level circuits	Pin plunger	0.25 N {25 gf}	AVT320064	AVT340064	AVT380064
			0.49 N {50 gf}	AVT320264	AVT340264	AVT380264
			0.98 N {100 gf}	AVT320464	AVT340464	AVT380464
Short hinge lever		0.098 N {10 gf}	AVT321064	AVT341064	AVT381064	
		0.20 N {20 gf}	AVT321264	AVT341264	AVT381264	
		0.39 N {40 gf}	AVT321464	AVT341464	AVT381464	
Hinge lever		0.078 N {8 gf}	AVT322064	AVT342064	AVT382064	
		0.16 N {16 gf}	AVT322264	AVT342264	AVT382264	
		0.34 N {35 gf}	AVT322464	AVT342464	AVT382464	
Long hinge lever		0.12 N {12 gf}	AVT323264	AVT343264	AVT383264	
		0.25 N {25 gf}	AVT323464	AVT343464	AVT383464	
Simulated roller lever		0.16 N {16 gf}	AVT324264	AVT344264	AVT384264	
		0.34 N {35 gf}	AVT324464	AVT344464	AVT384464	
Roller lever		0.20 N {20 gf}	AVT325264	AVT345264	AVT385264	
		0.39 N {40 gf}	AVT325464	AVT345464	AVT385464	

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# AV3,AVM3/AVT3,AVL3

## 3.FS switches (In-line terminal type)

Long life version

	Actuator	Operating force, Max.	Part No.				
			Self-standing solder terminal			Self-standing PC terminal	.110 Quick-connect terminal
			Without guard	With guard	With opposite side guard		
Silver alloy contact type	Pin plunger	1.47 N {150 gf}	AVM3205	AVM3105	AVM3305	AVM3405	AVM3805
	Short hinge lever	0.59 N {60 gf}	AVM3215	AVM3115	AVM3315	AVM3415	AVM3815
	Hinge lever	0.54 N {55 gf}	AVM3225	AVM3125	AVM3325	AVM3425	AVM3825
	Long hinge lever	0.44 N {45 gf}	AVM3235	AVM3135	AVM3335	AVM3435	AVM3835
	Simulated roller lever	0.54 N {55 gf}	AVM3245	AVM3145	AVM3345	AVM3445	AVM3845
	Roller lever	0.59 N {60 gf}	AVM3255	AVM3155	AVM3355	AVM3455	AVM3855
Gold-clad triple layer contact type	Pin plunger	1.47 N {150 gf}	AVM320561	AVM310561	AVM330561	AVM340561	AVM380561
	Short hinge lever	0.59 N {60 gf}	AVM321561	AVM311561	AVM331561	AVM341561	AVM381561
	Hinge lever	0.54 N {55 gf}	AVM322561	AVM312561	AVM332561	AVM342561	AVM382561
	Long hinge lever	0.44 N {45 gf}	AVM323561	AVM313561	AVM333561	AVM343561	AVM383561
	Simulated roller lever	0.54 N {55 gf}	AVM324561	AVM314561	AVM334561	AVM344561	AVM384561
	Roller lever	0.59 N {60 gf}	AVM325561	AVM315561	AVM335561	AVM345561	AVM385561
Gold-clad double layer type exclusively for low-level circuits	Pin plunger	1.47 N {150 gf}	AVM320564	AVM310564	AVM330564	AVM340564	AVM380564
	Short hinge lever	0.59 N {60 gf}	AVM321564	AVM311564	AVM331564	AVM341564	AVM381564
	Hinge lever	0.54 N {55 gf}	AVM322564	AVM312564	AVM332564	AVM342564	AVM382564
	Long hinge lever	0.44 N {45 gf}	AVM323564	AVM313564	AVM333564	AVM343564	AVM383564
	Simulated roller lever	0.54 N {55 gf}	AVM324564	AVM314564	AVM334564	AVM344564	AVM384564
	Roller lever	0.59 N {60 gf}	AVM325564	AVM315564	AVM335564	AVM345564	AVM385564

Remark: When ordering, please refer to "Remarks" of ordering information.

## 4.FS-T switches (Cross-line terminal type)

Long life version

	Actuator	Operating force, Max.	Part No.		
			Solder terminal Without guard	PC terminal	.110 Quick-connect terminal
Silver alloy contact type	Pin plunger	1.47 N {150 gf}	AVL3205	AVL3405	AVL3805
	Short hinge lever	0.59 N {60 gf}	AVL3215	AVL3415	AVL3815
	Hinge lever	0.54 N {55 gf}	AVL3225	AVL3425	AVL3825
	Long hinge lever	0.44 N {45 gf}	AVL3235	AVL3435	AVL3835
	Simulated roller lever	0.54 N {55 gf}	AVL3245	AVL3445	AVL3845
	Roller lever	0.59 N {60 gf}	AVL3255	AVL3455	AVL3855
Gold-clad triple layer contact type	Pin plunger	1.47 N {150 gf}	AVL320561	AVL340561	AVL380561
	Short hinge lever	0.59 N {60 gf}	AVL321561	AVL341561	AVL381561
	Hinge lever	0.54 N {55 gf}	AVL322561	AVL342561	AVL382561
	Long hinge lever	0.44 N {45 gf}	AVL323561	AVL343561	AVL383561
	Simulated roller lever	0.54 N {55 gf}	AVL324561	AVL344561	AVL384561
	Roller lever	0.59 N {60 gf}	AVL325561	AVL345561	AVL385561
Gold-clad double layer type exclusively for low-level circuits	Pin plunger	1.47 N {150 gf}	AVL320564	AVL340564	AVL380564
	Short hinge lever	0.59 N {60 gf}	AVL321564	AVL341564	AVL381564
	Hinge lever	0.54 N {55 gf}	AVL322564	AVL342564	AVL382564
	Long hinge lever	0.44 N {45 gf}	AVL323564	AVL343564	AVL383564
	Simulated roller lever	0.54 N {55 gf}	AVL324564	AVL344564	AVL384564
	Roller lever	0.59 N {60 gf}	AVL325564	AVL345564	AVL385564

Remark: When ordering, please refer to "Remarks" of ordering information.

## SPECIFICATIONS

### 1.Contact rating

Voltage	Standard version				Long life version			
	Silver alloy contact type		Gold-clad contact type		Silver alloy contact type		Gold-clad contact type	
	Resistive load ( $\cos\phi \approx 1$ )	Inductive load ( $\cos\phi \approx 0.6-0.7$ )	Triple layer	Double layer	Resistive load ( $\cos\phi \approx 1$ )	Inductive load ( $\cos\phi \approx 0.6-0.7$ )	Triple layer	Double layer
125V AC	3A	2A	0.1A	—	5A	3A	0.1A	—
250V AC	3A	2A	0.1A	—	5A	3A	0.1A	—
30V DC	3A	2A	0.1A	0.1A	5A	3A	0.1A	0.1A
125V DC	0.4A	0.05A	—	—	0.4A	0.05A	—	—

Remark: Time constant shall be less than 7 msec. for DC inductive loads.

### 2.Characteristics

	Standard version		Long life version	
	Silver alloy contact type	Gold-clad contact type	Silver alloy contact type	Gold-clad contact type
Electrical life at rated load (O.T.max.)	$5 \times 10^4$ at 20 cpm	$2 \times 10^5$ at 20 cpm	$5 \times 10^4$ at 20 cpm	$2 \times 10^5$ at 20 cpm
Mechanical life	$5 \times 10^5$ at 60 cpm (O.T.max.)		$3 \times 10^7$ (O.T.: Specified value) $10^7$ (O.T.max.) at 60 cpm	
Insulation resistance	Min.100M $\Omega$ at 500V DC			
Dielectric strength	1,000 Vrms			
Between non-continuous terminals	1,500 Vrms			
Between each terminal and other exposed metal parts	1,500 Vrms			
Between each terminal and ground	1,500 Vrms			
Vibration resistance (Pin plunger type)	10 to 55 Hz at single amplitude of 1.5mm (Contact opening: max.1 msec.)			
Shock resistance (Pin plunger type) (Contact opening: less than 1 msec.)	294 m/s <sup>2</sup> {30 G} min. (O.F. 0.98 N {100 gf}) 147 m/s <sup>2</sup> {15 G} min. (O.F. 0.49 N {50 gf})	294 m/s <sup>2</sup> {30 G} min. (O.F. 0.98 N {100 gf}) 147 m/s <sup>2</sup> {15 G} min. (O.F. 0.49 N {50 gf}) 49 m/s <sup>2</sup> {5 G} min. (O.F. 0.25 N {25 gf})	294 m/s <sup>2</sup> {30 G} min.	
Contact resistance (Initial)	50 m $\Omega$ max. (by voltage drop 1 A 6 to 8V DC)	100 m $\Omega$ max. (by voltage drop 0.1 A 6 to 8V DC)	Au: 50 m $\Omega$ max. (by voltage drop 0.1 A 6 to 8V DC) Ag: 50 m $\Omega$ max. (by voltage drop 1 A 6 to 8V DC)	
Allowable operating speed	0.1 to 1,000 mm/sec.			
Max.operating cycle rate	300 cpm			
Ambient tempeprature	-25°C to +85°C -13°F to +185°F (no freezing below 0°C)			
Ambient humidity	Max.85% R.H.			
Unit weight	Approx.2g .07oz			

### 3.Operating characteristics

#### 1) Pin plunger

4th digit number of Part No.	O.F.max.	R.F.min.	P.T.max.	M.D.max.	O.T.max.	O.P.
0	0.25N {25gf}	0.020N {2gf}	0.6mm .024inch	0.1mm .004inch	0.4mm .016inch	Distance from mounting holes: 8.4 $\pm$ 0.3mm .331 $\pm$ .012inch Distance from stand-off: FS 11.8 $\pm$ 0.4mm .465 $\pm$ .016inch FS-T 11.7 $\pm$ 0.4mm .461 $\pm$ .016inch
2	0.49N {50gf}	0.074N {7.5gf}				
4	0.98N {100gf}	0.15N {15gf}				
5	1.47N {150gf}	0.20N {20gf}				

#### 2) Short hinge lever

4th digit number of Part No.	O.F.max.	R.F.min.	P.T.max.	M.D.max.	O.T.max.	O.P.
0	0.098N {10gf}	0.004N {0.4gf}	2.5mm .098inch	0.5mm .020inch	0.8mm .031inch	Distance from mounting holes: 8.8 $\pm$ 0.8mm .346 $\pm$ .031inch Distance from stand-off: FS 12.2 $\pm$ 0.9mm .480 $\pm$ .035inch FS-T 12.1 $\pm$ 0.9mm .476 $\pm$ .035inch
2	0.20N {20gf}	0.017N {1.7gf}				
4	0.39N {40gf}	0.034N {3.5gf}				
5	0.59N {60gf}	0.039N {4.0gf}				

# AV3,AVM3/AVT3,AVL3

## 3) Hinge lever

4th digit number of Part No.	O.F.max.	R.F.min.	P.T.max.	M.D.max.	O.T.max.	O.P.
0	0.078N {8gf}	0.003N {0.35gf}	2.8mm .110inch	0.8mm .031inch	1.2mm .047inch	Distance from mounting holes: 8.8±0.8mm .346±.031inch Distance from stand-off: FS 12.2±0.9mm .480±.035inch FS-T 12.1±0.9mm .476±.035inch
2	0.16N {16gf}	0.015N {1.5gf}				
4	0.34N {35gf}	0.029N {3.0gf}				
5	0.54N {55gf}	0.034N {3.5gf}				

## 4) Long hinge lever

4th digit number of Part No.	O.F.max.	R.F.min.	P.T.max.	M.D.max.	O.T.max.	O.P.
0	—	—	3.5mm .138inch	1.0mm .039inch	1.6mm .063inch	Distance from mounting holes: 8.8±1.2mm .346±.047inch Distance from stand-off: FS 12.2±1.3mm .480±.051inch FS-T 12.1±1.3mm .476±.051inch
2	0.12N {12gf}	0.012N {1.2gf}				
4	0.25N {25gf}	0.025N {2.5gf}				
5	0.44N {45gf}	0.029N {3.0gf}				

## 5) Simulated roller lever

4th digit number of Part No.	O.F.max.	R.F.min.	P.T.max.	M.D.max.	O.T.max.	O.P.
0	—	—	2.8mm .110inch	0.8mm .031inch	1.2mm .047inch	Distance from mounting holes: 11.65±0.8mm .459±.031inch Distance from stand-off: FS 15.05±0.9mm .593±.035inch FS-T 14.95±0.9mm .589±.035inch
2	0.16N {16gf}	0.015N {1.5gf}				
4	0.34N {35gf}	0.029N {3.0gf}				
5	0.54N {55gf}	0.034N {3.5gf}				

## 6) Roller lever

4th digit number of Part No.	O.F.max.	R.F.min.	P.T.max.	M.D.max.	O.T.max.	O.P.
0	—	—	2.5mm .098inch	0.5mm .020inch	0.8mm .031inch	Distance from mounting holes: 14.5±0.8mm .571±.031inch Distance from stand-off: FS 17.9±0.9mm .705±.035inch FS-T 17.8±0.9mm .701±.035inch
2	0.20N {20gf}	0.017N {1.7gf}				
4	0.39N {40gf}	0.034N {3.5gf}				
5	0.59N {60gf}	0.039N {4.0gf}				

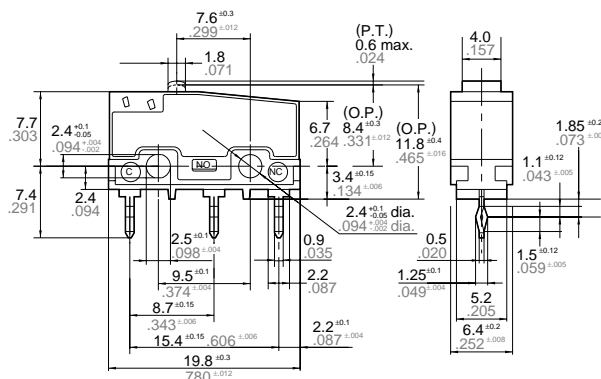
## DIMENSIONS

mm inch General tolerance ±0.25 ±.010

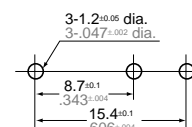
### 1.FS switches (In-line terminal type)

#### 1-(1) Self-standing solder terminal

#### Pin plunger



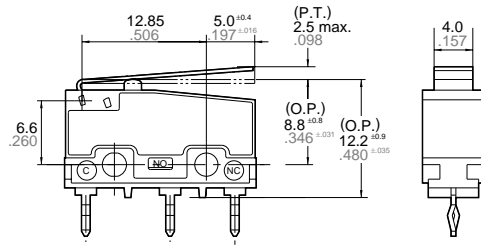
#### PC board pattern



Pretravel, Max. mm inch	0.6 / .024	
Movement differential, Max. mm inch	0.1 / .004	
Overtravel, Min. mm inch	0.4 / .016	
Operating position	Distance from mounting hole, mm inch	8.4±0.3 / .331±.012
	Distance from standoff, mm inch	11.8±0.4 / .465±.016



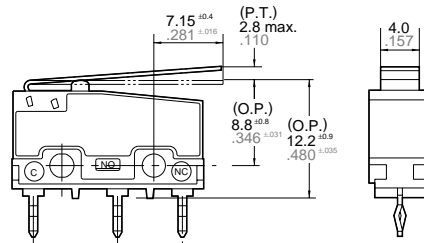
## Short hinge lever



Pretravel, Max. mm inch		2.5 .098
Movement differential, Max. mm inch		0.5 .020
Overtravel, Min. mm inch		0.8 .031
Operating position	Distance from mounting hole, mm inch	8.8±0.8 .346±.031
	Distance from standoff, mm inch	12.2±0.9 .480±.035

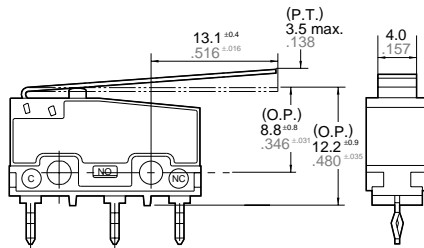
## Hinge lever

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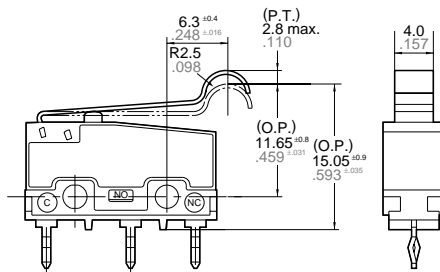
Pretravel, Max. mm inch		2.8 .110
Movement differential, Max. mm inch		0.8 .031
Overtravel, Min. mm inch		1.2 .047
Operating position	Distance from mounting hole, mm inch	8.8±0.8 .346±.031
	Distance from standoff, mm inch	12.2±0.9 .480±.035

## Long hinge lever



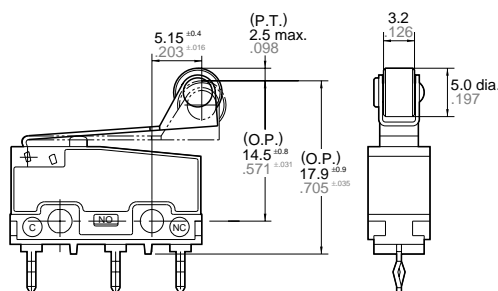
Pretravel, Max. mm inch		3.5 .138
Movement differential, Max. mm inch		1.0 .039
Overtravel, Min. mm inch		1.6 .063
Operating position	Distance from mounting hole, mm inch	8.8±1.2 .346±.047
	Distance from standoff, mm inch	12.2±1.3 .480±.051

## Simulated roller lever



Pretravel, Max. mm inch		2.8 .110
Movement differential, Max. mm inch		0.8 .031
Overtravel, Min. mm inch		1.2 .047
Operating position	Distance from mounting hole, mm inch	11.65±0.8 .459±.031
	Distance from standoff, mm inch	15.05±0.9 .593±.035

## Roller lever

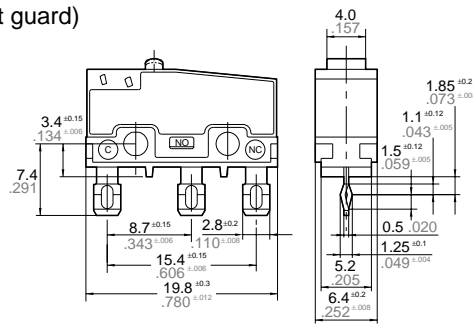


Pretravel, Max. mm inch		2.5 .098
Movement differential, Max. mm inch		0.5 .020
Overtravel, Min. mm inch		0.8 .031
Operating position	Distance from mounting hole, mm inch	14.5±0.8 .571±.031
	Distance from standoff, mm inch	17.9±0.9 .705±.035

# AV3,AVM3/AVT3,AVL3

## 1-(2) Self-standing solder terminal (without guard)

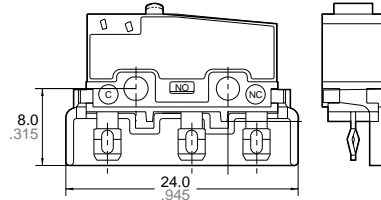
mm inch General tolerance  $\pm 0.25 \pm 0.10$



Dimensions other than drawn above is same as self-standing PC board terminal.

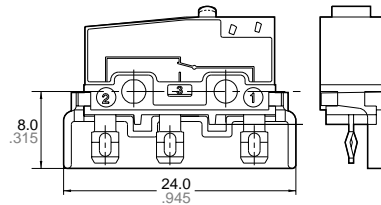
## 1-(3) Self-standing solder terminal (with guard)

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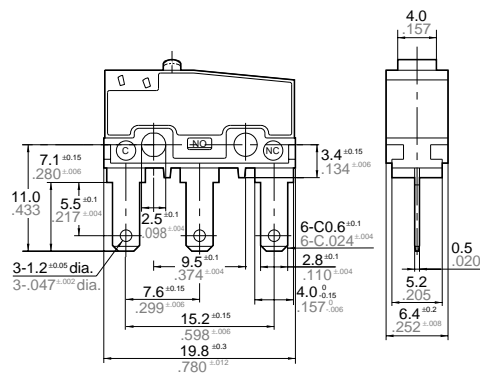
Dimensions other than drawn above is same as guardless type.

## 1-(4) Self-standing solder terminal (with opposite side guard)



Dimensions other than drawn above is same as guardless type.

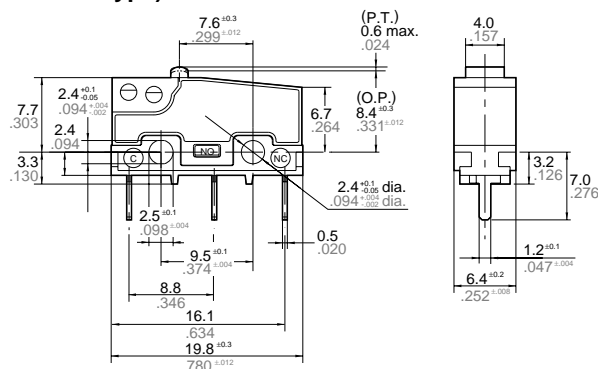
## 1-(5) .110 Quick-connect terminal



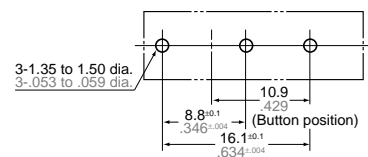
Dimensions other than drawn above is same as self-standing PC board terminal.

## 2.FS-T switches (Cross-line terminal type)

### 2-(1) PC board terminal Pin plunger



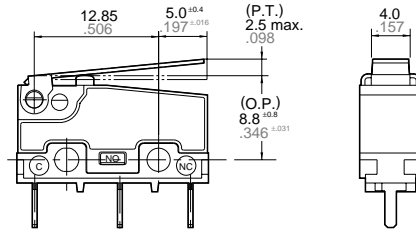
### PC board pattern



Pretravel, Max. mm inch		0.6 / .024
Movement differential, Max. mm inch		0.1 / .004
Overtravel, Min. mm inch		0.4 / .016
Operating position	Distance from mounting hole, mm inch	8.4 $\pm$ 0.3 / .331 $\pm$ 0.012
	Distance from standoff, mm inch	11.7 $\pm$ 0.4 / .461 $\pm$ 0.016

## Short hinge lever

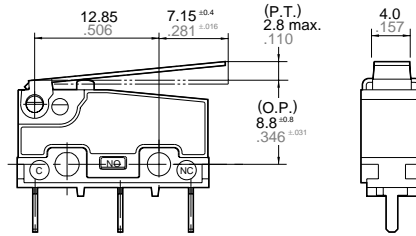
mm inch General tolerance  $\pm 0.25 \pm 0.10$



Pretravel, Max. mm inch	2.5 .098	
Movement differential, Max. mm inch	0.5 .020	
Overtravel, Min. mm inch	0.8 .031	
Operating position	Distance from mounting hole, mm inch	8.8±0.8 .346±.031
	Distance from standoff, mm inch	12.1±0.9 .476±.035

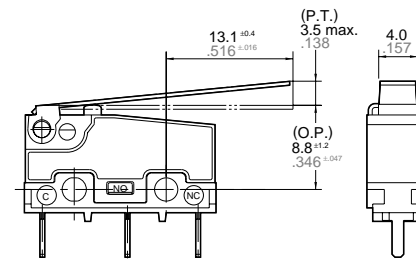
## Hinge lever

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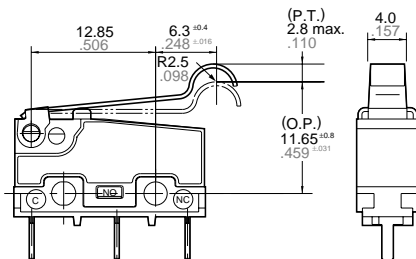
Pretravel, Max. mm inch	2.8 .110	
Movement differential, Max. mm inch	0.8 .031	
Overtravel, Min. mm inch	1.2 .047	
Operating position	Distance from mounting hole, mm inch	8.8±0.8 .346±.031
	Distance from standoff, mm inch	12.1±0.9 .476±.035

## Long hinge lever



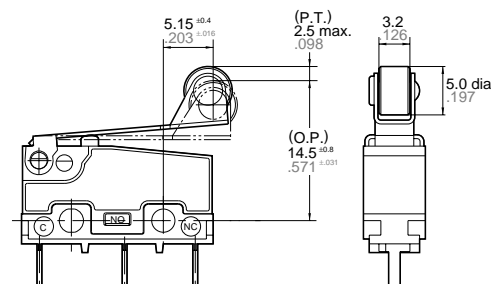
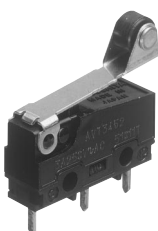
Pretravel, Max. mm inch	3.5 .138	
Movement differential, Max. mm inch	1.0 .039	
Overtravel, Min. mm inch	1.6 .063	
Operating position	Distance from mounting hole, mm inch	8.8±1.2 .346±.047
	Distance from standoff, mm inch	12.1±1.3 .476±.051

## Simulated roller lever



Pretravel, Max. mm inch	2.8 .110	
Movement differential, Max. mm inch	0.8 .031	
Overtravel, Min. mm inch	1.2 .047	
Operating position	Distance from mounting hole, mm inch	11.65±0.8 .459±.031
	Distance from standoff, mm inch	14.95±0.9 .589±.035

## Roller lever

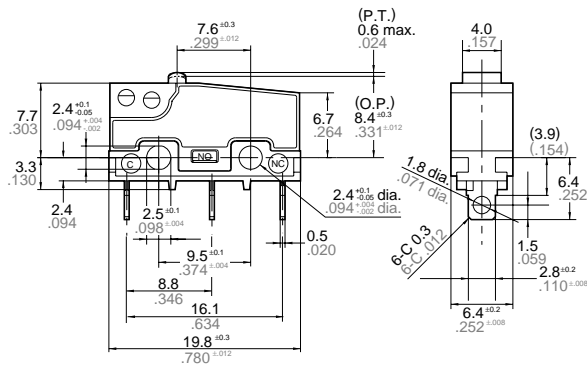


Pretravel, Max. mm inch	2.5 .098	
Movement differential, Max. mm inch	0.5 .020	
Overtravel, Min. mm inch	0.8 .031	
Operating position	Distance from mounting hole, mm inch	14.5±0.8 .571±.031
	Distance from standoff, mm inch	17.8±0.9 .701±.035

# AV3,AVM3/AVT3,AVL3

## 2-(2) Self-standing solder terminal

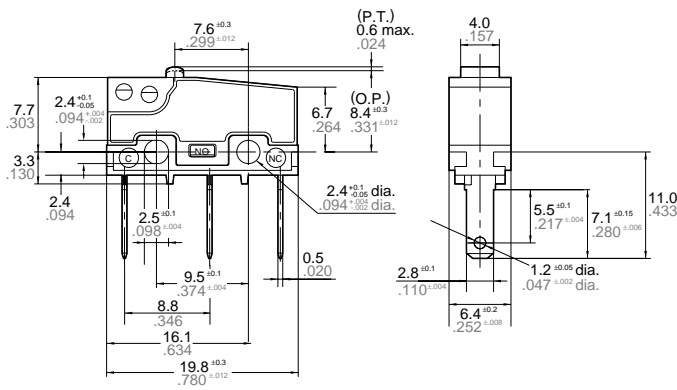
mm inch General tolerance  $\pm 0.25 \pm 0.10$



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As for the dimensions of lever types, dimensions other than terminals are same as self-standing solder terminal.

## 2-(3) .110 Quick-connect terminal



As for the dimensions of lever types, dimensions other than terminals are same as self-standing solder terminal.

## NOTES

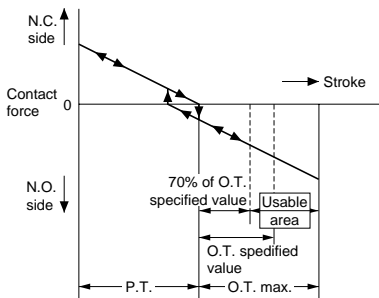
### 1.Regarding fastening of switch body

In fastening the switch body, use flat filister head M2.3 screws, with tightening torque of not more than 3 kg-cm. To prevent loosening of the screws, it is recommended that spring washers be used with the screws and adhesive be applied to lock the screws.

After mounting the switch and making wiring connectors, the insulation distance between ground and each terminal should be confirmed as sufficient.

The positioning of the switch should be such that the pushbutton or actuator for the switch should not directly apply force to the operating section in the free condition. For a pushbutton, the force from the pushbutton should be applied in a perpendicular direction.

In setting the movement after operation, the over-travel should be set not less than 70% as a standard. Setting the movement at less than 70% of O.T. may cause troubles such as mis-contact and welding due to small contact force of the switch.



### 2.Soldering operation

For manual soldering: 60W soldering iron, soldering completed within 3 seconds; do not apply force to the terminals.

For automatic soldering tank: 250°C +482°F immersion, completed within 6 seconds, 350°C +662°F immersion, completed within 3 seconds.

Terminal portions must not be moved in min. 1 minutes after soldering. Also no tensile strength of lead wires should be applied to terminals.

### 3.Regarding connector connections (.110 quick connect terminals)

For making connections, a dedicated receptacle for .110 quick connect terminals should be used, and the terminals should be inserted parallel to the receptacle. Consideration should be given to mounting so that no tensile load is applied to the lead wires.

### 4.In making the switch selection

Consideration should be given to provide for no interference up to +20% variation of the standard characteristics values.

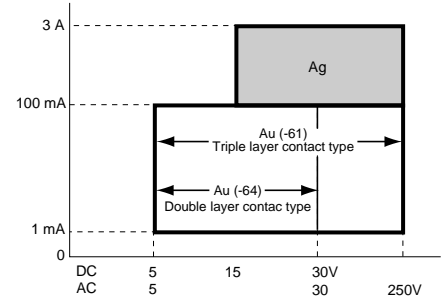
### 5.Environment

Locations where corrosive gases having a bad influence on contacts are present, and locations where there is an excessive amount of siliceous or other abrasive dust should be avoided.

### 6.Cautions regarding use

This subminiatures switch has been designed as a dedicated switch for AC use, but it can be used for low capacity DC circuits.

Please select gold-clad contact types when loads are in the low-level area of 1mA up to 100mA and 5V up to 30V.



For switching of inductive loads (relays, solenoids, buzzers, etc.), in order to prevent damage to contacts due to the occurrence of arcing, an arc absorbing circuit should be applied

### 7.Quality check under Actual Loading Condition

To assure reliability, check the switch under actual loading conditions. Avoid any situation that may adversely affect switching performance.

**8.When using lever type switch, care should be taken not to apply undue force on the body from the opposite side or side ways to its operating direction.**

**NAiS**

**SUBMINIATURE SWITCHES**  
(Contact gap: more than 1mm .039inch type)

**FS**  
(AV3□□□G)  
**SWITCHES**



www.DataSheet4U.com

**FEATURES**

- Conforming to IEC950
- Contact gap of greater than 1mm .039inch
- UL/CSA/VDE/SEMKO under application

**TYPICAL APPLICATIONS**

- Office equipment (printers, copiers)

**ORDERING INFORMATION**

Ex. AV 3 2 5 5 G

Type of switch	Version	Terminals	Actuators	Operating force by pin plunger, max.	Contact gap
FS switch	3: Standard	2: Self-standing solder terminal without guard 4: Self-standing PC terminal 8: .110 Quick-connect terminal	0: Pin plunger 1: Short hinge lever 2: Hinge lever 3: Long hinge lever 4: Simulated roller lever 5: Roller lever	5: 1.47 N {150 gf}	G: More than 1 mm type

**PRODUCT TYPES**

Actuator	Operating force Max.	Solder terminal	PC board terminal	.110 Quick- connect terminal
		Without guard		
Pin plunger	1.47 N {150 gf}	AV3205G3	AV3405G3	AV3805G3
Short hinge lever	0.59 N {60 gf}	AV3215G3	AV3415G3	AV3815G3
Hinge lever	0.54 N {55 gf}	AV3225G3	AV3425G3	AV3825G3
Long hinge lever	0.44 N {45 gf}	AV3235G3	AV3435G3	AV3835G3
Simulated roller lever	0.54 N {55 gf}	AV3245G3	AV3445G3	AV3845G3
Roller lever	0.59 N {60 gf}	AV3255G3	AV3455G3	AV3855G3

Remark: Unless you request otherwise, the switch comes with a stamp indicating its conformance to standards.

**SPECIFICATIONS**

**1. Contact rating**

- Silver alloy contact type

Voltage	Resistive road (cos φ≅ 1)
30 V DC	3 A

**2. Characteristics**

Item	Characteristics	
Expected life	Mechanical (O.T.: Specified value)	Min. $5 \times 10^5$ (at 60cpm)
	Electrical (O.T. max.)	Min. $10^4$ (at 20cpm)
Breakdown voltage	Between non-continuous terminals	1,000 Vrms for 1 min. (at 10mA)
	Between each terminal and other exposed metal parts	2,000 Vrms for 1 min. (at 10mA)
	Between each terminal and ground	2,000 Vrms for 1 min. (at 10mA)
Insulation resistance	Min. 100M $\Omega$ (at 500 V DC)	
Contact resistance (Initial)	Max. 50m $\Omega$ (by voltage drop 6 to 8 V DC 1A)	
Vibration resistance	10 to 55 Hz at single amplitude of 0.75 mm (Contact opening: Max. 1 msec.)	
Shock resistance	Pin plunger type	294m/s <sup>2</sup> {30G} (Contact distance: Max. 1 msec.)
	Lever type	147m/s <sup>2</sup> {15G} (Contact distance: Max. 1 msec.)
Allowable operation speed (No load)	0.1 to 1,000 mm/s	
Max. switching frequency (No load)	300 cpm.	
Ambient temperature	-25°C to +85°C -13°F to +185°F (Not freezing below 0°C 32°F)	
Ambient humidity	Max. 85% R.H.	

Remark: Test conditions are in accordance with JIS C 4505.

**3. Operating characteristics**

Actuator	Operating force, Max.	Release force, Min.	Pretravel, Max. mm inch	Movement differential, Max. mm inch	Overtravel, Min. mm inch	Operating position, mm inch
Pin plunger	1.47 N {150 gf}	0.064 N {6.5 gf}	0.7 .028	0.2 .008	0.3 .012	8.4±0.3 .331±.012
Short hinge lever	0.59 N {60 gf}	0.015 N {1.5 gf}	2.5 .098	0.8 .031	0.6 .024	8.8±0.8 .346±.031
Hinge lever	0.54 N {55 gf}	0.013 N {1.3 gf}	2.8 .110	1.0 .039	0.8 .031	8.8±0.8 .346±.031
Long hinge lever	0.44 N {45 gf}	0.0098 N {1.0 gf}	3.5 .138	1.2 .047	1.2 .047	8.8±1.2 .346±.047
Simulated roller lever	0.54 N {55 gf}	0.013 N {1.3 gf}	2.8 .110	1.0 .039	0.8 .031	11.65±0.8 .459±.031
Roller lever	0.59 N {60 gf}	0.015 N {1.5 gf}	2.5 .098	0.8 .031	0.6 .024	14.5±0.8 .571±.031

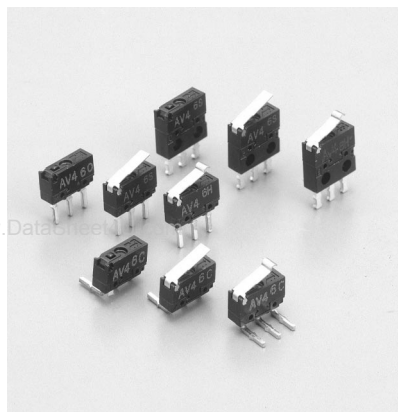
**DIMENSIONS**

The same size as the standard FS/FS-T switches.  
Please refer to "FS/FS-T switches pages" or our web site.  
URL: <http://www.mew.co.jp/e-acg/>

# NAIS

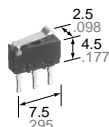
**ONE OF THE SMALLEST  
SNAP-ACTION SWITCH  
IN THE WORLD**

# FU (AV4) SWITCHES

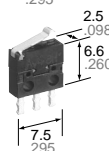


### FEATURES

- Superminiature type, light-weight snap action switch  
PC board terminal type  
(0.2g .007oz)



- Solder terminal type with mounting holes  
(0.3g .011oz)

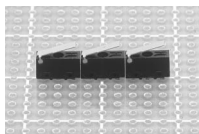
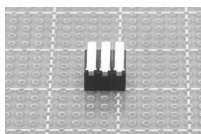


mm inch

- Mechanical life of 300,000 operations minimum

Stainless steel plated silver or gold is used for actuating spring

- Switches can be mounted close together in any directions



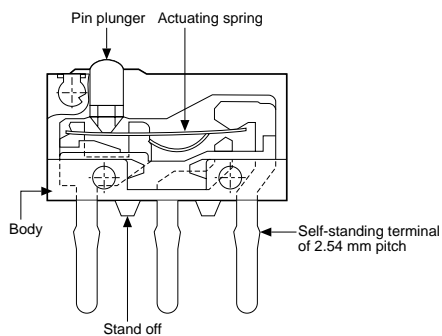
### ORDERING INFORMATION

Ex. AV 4 4 0 4 61

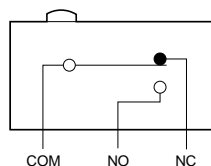
Product Name	Terminals	Actuators	Operating force, max. (by pin plunger)	Contacts
FU	0: Solder terminal with mounting holes (1.65 mm dia. .065 inch dia.) 4: PC board straight terminal 5: PC board angle terminal 6: PC board reverse angle terminal	0: Pin plunger 2: Hinge lever 4: Simulated roller lever	4: 0.98 N {100 gf}	Nil: Silver contact 61: Gold contact

### CONSTRUCTION

PC board straight terminal type



### SCHEMATIC





**PRODUCT TYPES**

Type of contacts	Actuator	Operating force, Max.	Type No.			
			PC board terminal			Solder terminal with mounting holes
			Straight terminal	Angle terminal	Reverse angle terminal	
Silver contact type	Pin plunger	0.98 N {100 gf}	AV4404	AV4504	AV4604	AV4004
	Hinge lever	0.25 N {25 gf}	AV4424	AV4524	AV4624	AV4024
	Simulated roller lever	0.29 N {30 gf}	AV4444	AV4544	AV4644	AV4044
Gold contact type	Pin plunger	0.98 N {100 gf}	AV440461	AV450461	AV460461	AV400461
	Hinge lever	0.25 N {25 gf}	AV442461	AV452461	AV462461	AV402461
	Simulated roller lever	0.29 N {30 gf}	AV444461	AV454461	AV464461	AV404461

**SPECIFICATIONS**

**1. Contact rating**

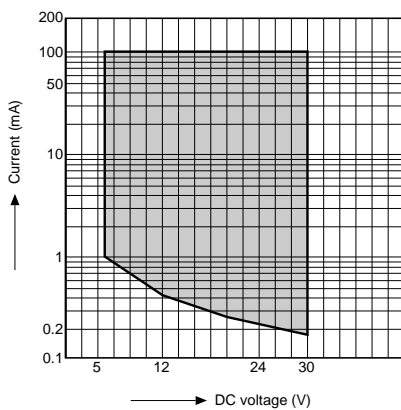
Type of contact	Resistive load (cosφ≒1)
Silver contact	0.5A 30V DC
Gold contact	0.1A 30V DC

**2. Characteristics**

Items		Characteristics	
Life	Mechanical	Min. 3 × 10 <sup>5</sup> operations (at 60 cpm)	
	Electrical	Silver contact	Min. 2 × 10 <sup>4</sup> operations (0.5A 30V DC; at 20 cpm)
		Gold contact	Min. 2 × 10 <sup>5</sup> operations (0.1A 30V DC; at 20 cpm)
Insulation resistance		Min. 100 MΩ (250V DC by insulation resistance meter)	
Voltage withstand	Between non-continuous terminals	500V AC for 1 min.	
	Between each terminal and other exposed metal parts	500V AC for 1 min.	
	Between each terminal and ground	500V AC for 1 min.	
Vibration resistance	Pin plunger type	10 to 55 Hz at single amplitude of 0.75mm (contact opening: max. 1 msec.)	
	Lever type	10 to 55 Hz at single amplitude of 0.15mm (contact opening: max. 1 msec.)	
Shock resistance	Pin plunger type	Min. 294m/s <sup>2</sup> {30G} (contact opening: max. 1 msec.)	
	Lever type	Min. 147m/s <sup>2</sup> {15G} (contact opening: max. 1 msec.)	
Contact resistance (initial value)		Max. 200 mΩ (by YHP4328A)	
Allowable operation speed		0.1mm/s to 500mm/s (pin plunger type)	
Mechanical max. switching frequency		60 operations/min.	
Ambient temperature		-25 to +80°C -13 to +176°F (Not freezing below 0°C 32°F)	
Ambient humidity		Max. 85% R.H.	
Unit weight		PC board terminal type: Approx. 0.2g .007oz Solder terminal with mounting holes type: Approx. 0.3g .011oz	

**DATA**

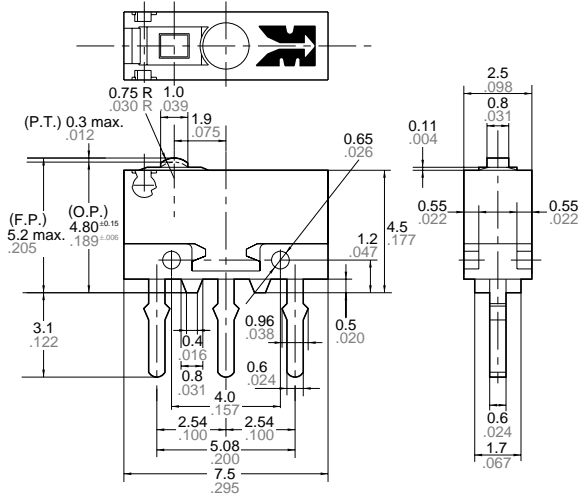
Gold contact type  
Range of low-level current and voltage



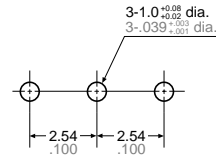
**DIMENSIONS**

mm inch General tolerance  $\pm 0.15 \pm 0.006$

**1. PC board terminal**  
Straight terminal  
Pin plunger type

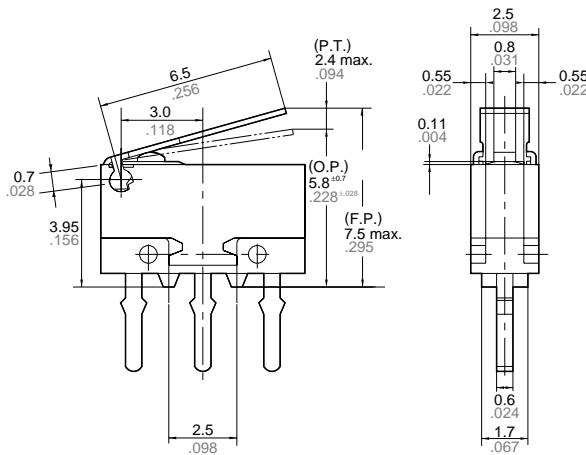


PC board pattern



Pretravel	0.3 .012 max.
Movement Differential	0.1 .004 max.
Overtravel	0.1 .004 min.
Operating Position	4.8 $\pm$ 0.15 .189 $\pm$ .006
Free Position	5.2 .205 max.

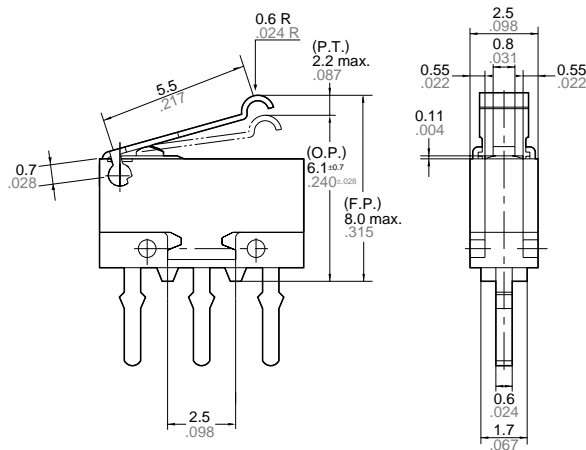
Hinge lever type



Pretravel	2.4 .094 max.
Movement Differential	0.7 .028 max.
Overtravel	0.4 .016 min.
Operating Position	5.8 $\pm$ 0.7 .228 $\pm$ .028
Free Position	7.5 .295 max.

Note: All other dimensions are the same as those of pin plunger type.

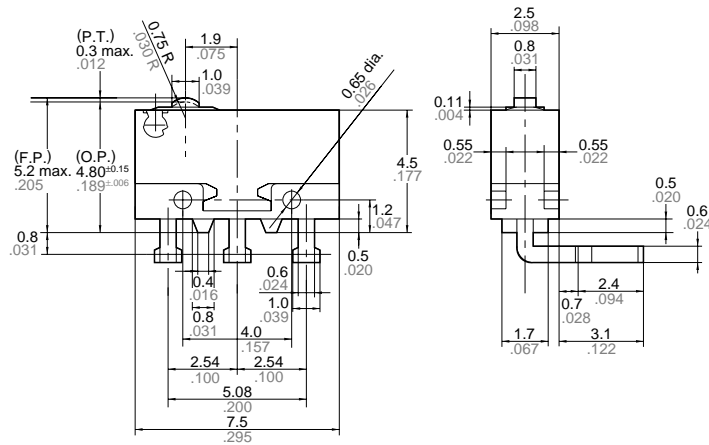
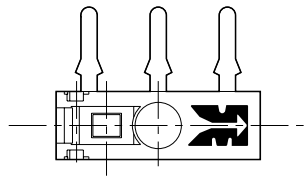
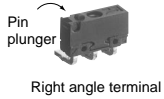
Simulated roller lever type



Pretravel	2.2 .087 max.
Movement Differential	0.7 .028 max.
Overtravel	0.3 .012 min.
Operating Position	6.1 $\pm$ 0.7 .240 $\pm$ .028
Free Position	8.0 .315 max.

Note: All other dimensions are the same as those of pin plunger type.

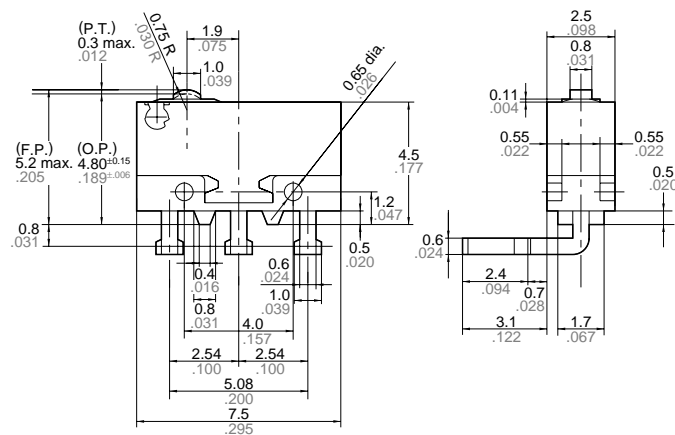
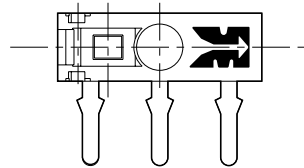
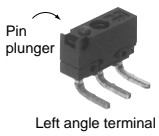
### 2. Angle terminal Right angle terminal Pin plunger type



Pretravel	0.3 .012 max.
Movement Differential	0.1 .004 max.
Overtravel	0.1 .004 min.
Operating Position	4.8 $\pm 0.15$ .189 $\pm .006$
Free Position	5.2 .205 max.

Note: All other dimensions of hinge lever type and simulated roller lever type are the same as those of straight terminal types.

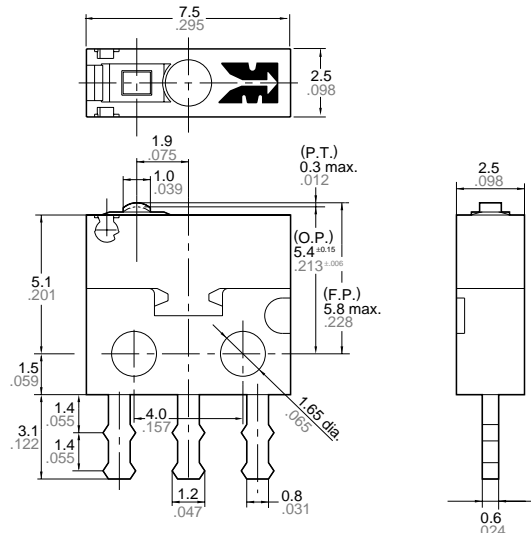
### Left angle terminal Pin plunger type



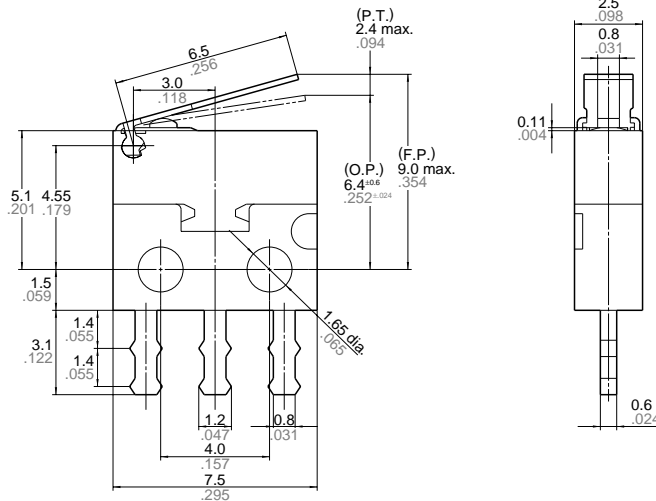
Pretravel	0.3 .012 max.
Movement Differential	0.1 .004 max.
Overtravel	0.1 .004 min.
Operating Position	4.8 $\pm 0.15$ .189 $\pm .006$
Free Position	5.2 .205 max.

Note: All other dimensions of hinge lever type and simulated roller lever type are the same as those of straight terminal types.

### 3. Solder terminal with mounting holes Pin plunger type



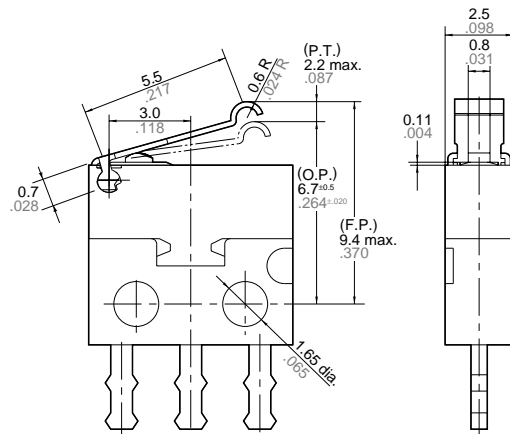
Pretravel	0.3 .012 max.
Movement Differential	0.1 .004 max.
Overtravel	0.1 .004 min.
Operating Position	5.4 $\pm 0.15$ .213 $\pm .006$
Free Position	5.8 .228 max.



Pretravel	2.4 .094 max.
Movement Differential	0.7 .028 max.
Overtravel	0.4 .016 min.
Operating Position	6.4±0.6 .252±.024
Free Position	9.0 .354 max.

Note: All other dimensions are the same as those of pin plunger type.

## Simulated roller lever type



Pretravel	2.2 .087 max.
Movement Differential	0.7 .028 max.
Overtravel	0.3 .012 min.
Operating Position	6.7±0.5 .264±.020
Free Position	9.4 .370 max.

Note: All other dimensions are the same as those of pin plunger type.

## NOTES

### 1. Mounting

- 1) After mounting and wiring, the insulation distance between ground and each terminal should be confirmed as sufficient.
- 2) When the operation object is in the free position, force should not be applied to the actuator or to the pin plunger. Also force should be applied to the pin plunger from vertical direction to the switch.
- 3) In setting the movement after operation, the over-travel should be set within the range of the specified O.T. value.
- 4) In fastening the switch body, use the M1.4 screw, with tightening torque of not more than 1 kg-cm. To prevent loosening of the screws, it is recommended that spring washers be used with the screws and adhesive be applied to lock the screws.

### 2. Soldering

- 1) Hand soldering should be accomplished in less than 5 seconds with an iron below 18 watts. Keep the soldering tip temperature less than 320°C 608°F. Avoid applying force to the terminals.
- 2) In the case of automatically soldering bath, soldering should be done less than 5 seconds in 260°C 500°F solder bath.
- 3) Terminal portion must not be moved within 1 minute after soldering. Also no tensile strength of lead wires should be applied to the terminals.
- 4) When using the angle terminal type, insert an insulation separator between the switch body and the printed circuit board (Insulation separator 0.2 to 0.4mm .008 to .016 inch thick) to prevent the soldering flux from flowing under the PC board.

### 3. Cleaning

As FU switch is not completely sealed construction, avoid cleaning.

### 4. Selection of switch

When specifying FU switches, allow  $\pm 20\%$  to the listed operating characteristics.

### 5. Avoid using and keeping switches in the following conditions:

- In corrosive gases
- In a dusty environment
- Where silicon atmosphere prevails

### 6. When switching low-level circuits (max. 100 mA), gold contact types are recommended.

### 7. When using the lever type, avoid applying force from the reverse and side direction of actuating.

# NAiS

## S Model Switch Connector Type

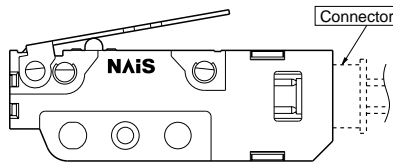
# CS (AV6) SWITCHES

### FEATURES

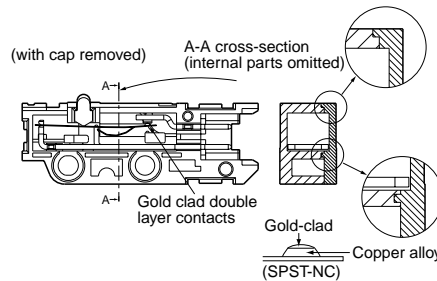
- Using a connector for connections significantly improves operation effectiveness.

Applicable connector:  
XA connector produced by JST Mfg. Co., Ltd.

- Contact: SXA-001T-P0.6
- Housing: XAP-02V-1



- Contact reliability is achieved by simple dust prevention guard and gold-clad double layer contacts

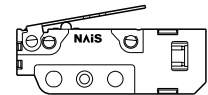


- The contact arrangement is available in two types, the SPST-NC and the SPST-NO.

- The lever position is available in two types.

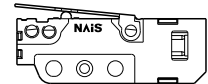
Standard lever position

"Standard lever position" refers to a position in which the lever is installed with the plunger close to the reference.



Backward lever position

"Backward lever position" refers to a position in which the lever is installed with the plunger far away from the reference.



### TYPICAL APPLICATIONS

- Detection of vending machine condition whether cans are out of stock
- Ball detection of pinball game machine
- PPC (Plain Paper Copier)
- LBP (Laser Beam Printer)

### ORDERING INFORMATION

Ex. AV6 2 2 2 12 64

Type of switch	Contact arrangement	Actuators	O.F. (by pin plunger)	Lever position	Contacts
AV6: CS switch	2: SPST-NC 3: SPST-NO	0: Pin plunger 2: Hinge lever 4: Simulated roller lever 5: Roller lever	2: 0.50 N {51gf} 5: 1.50 N {153gf}	Nil: Standard 12: Backward	64: Gold clad double layer

Remarks: 1. Standard packing Inner carton: 100 pcs. Outer carton: 1,000 pcs.  
2. When ordering UL, CSA and TÜV approved types, please attach suffix "3" to the part no.

## PRODUCT TYPES

### 1. Lever position: Standard

Actuator	Operating force, Max.	Contact arrangement	
		SPST-NC	SPST-NO
Pin plunger	0.50N{51gf}	AV620264	AV630264
	1.50N{153gf}	AV620564	AV630564
Hinge lever	0.20N{20gf}	AV622264	AV632264
	0.50N{51gf}	AV622564	AV632564
Simulated roller lever	0.20N{20gf}	AV624264	AV634264
	0.50N{51gf}	AV624564	AV634564
Roller lever	0.20N{20gf}	AV625264	AV635264
	0.50N{51gf}	AV625564	AV635564

Remarks: 1. When ordering UL, CSA and TÜV approved (under application) types, please attach suffix "3" to the part no.

2. 1N = 0.101971621kgf

### 2. Lever position: Backward

Actuator	Operating force, Max.	Contact arrangement	
		SPST-NC	SPST-NO
Hinge lever	0.35N{35gf}	AV62221264	AV63221264
	1.00N{102gf}	AV62251264	AV63251264
Simulated roller lever	0.35N{35gf}	AV62421264	AV63421264
	1.00N{102gf}	AV62451264	AV63451264
Roller lever	0.35N{35gf}	AV62521264	AV63521264
	1.00N{102gf}	AV62551264	AV63551264

Remarks: 1. When ordering UL, CSA and TÜV approved (under application) types, please attach suffix "3" to the part no.

2. 1N = 0.101971621kgf

## SPECIFICATIONS

### 1. Contact rating

Contact	Voltage	Resistive load ( $\cos \phi \approx 1$ )
Gold clad double layer	DC30[V]	0.1[A]
	DC 5[V]	1[mA] Low-level circuit rating

### 2. Characteristics

Expected life	Mechanical	Min. $5 \times 10^5$ (at 60 cpm) (O.T. max.)
	Electrical (Rated load)	Min. $2 \times 10^5$ (at 20 cpm) (O.T. max.)
Insulation resistance		Min. 100M $\Omega$
Dielectric strength	Between terminals	1,000 Vrms for 1 min.
	Between terminals and other exposed metal parts	1,500 Vrms for 1 min.
	Between terminals and ground	1,500 Vrms for 1 min.
Contact resistance (initial)		100M $\Omega$ max. (by voltage drop 0.1A 6 to 8 VDC) Value includes the resistance between the connector and the lead (#AWG28, length: 50 mm 1.969inch)
Vibration resistance		10 to 55 Hz at single amplitude of 0.75mm (Contact opening: max. 1msec.)
Shock resistance		Applied shock 1.50N{153gf}type: Min.300m/s <sup>2</sup> {Contact opening: Max. 1msec.} 0.50N{51gf}type: Min.150m/s <sup>2</sup> {Contact opening: Max. 1msec.}
Connector insertion force		Max. 20N (inserted in removal direction)
Connector holding force		Min. 20N (extracted by static load, in removal direction)
Connector removal operating times		Max. 5 times (in removal direction)
Allowable operating speed (No load)		0.1 to 1,000 mm/s (at pin plunger)
Max. operating cycle rate (No load)		300 cpm
Ambient temperature		-25 to +85°C -13 to +185°F (No freezing and condensing)
Ambient humidity		Max. 85% R.H.
Unit weight		Approx. 2.5g .09oz (pin plunger type)

**3. Operating characteristics**

1) Lever position: Standard

Type of actuator	Operating force, Max.	Release force, Min.	Pretravel, Max. mm inch	Movement differential, Max, mm inch	Overtravel, Min. mm inch	Operating position, mm inch
Pin plunger	0.50N{51gf}	0.04N{4gf}	0.6	0.1	0.4	8.4±0.3
	1.50N{153gf}	0.25N{25gf}	.024	.004	.016	.331±.012
Hinge lever	0.20N{20gf}	0.02N{2gf}	2.6	0.8	1.2	10.0±0.8
	0.50N{51gf}	0.06N{6gf}	.102	.031	.047	.394±.031
Simulated roller lever	0.20N{20gf}	0.02N{2gf}	2.6	0.8	1.2	12.2±0.8
	0.50N{51gf}	0.06N{6gf}	.102	.031	.047	.480±.031
Roller lever	0.20N{20gf}	0.02N{2gf}	2.6	0.8	1.2	15.7±0.8
	0.50N{51gf}	0.06N{6gf}	.102	.031	.047	.618±.031

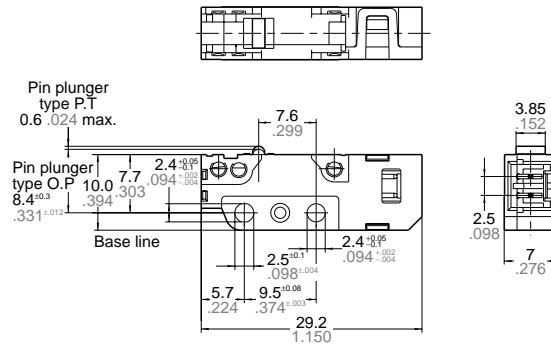
2) Lever position: Backward

Type of actuator	Operating force, Max.	Release force, Min.	Pretravel, Max. mm inch	Movement differential, Max, mm inch	Overtravel, Min. mm inch	Operating position, mm inch
Hinge lever	0.35N{35gf}	0.03N{3gf}	1.4	0.6	0.7	9.2±0.6
	1.00N{102gf}	0.10N{10gf}	.055	.024	.028	.362±.024
Simulated roller lever	0.35N{35gf}	0.03N{3gf}	1.4	0.6	0.7	11.3±0.6
	1.00N{102gf}	0.10N{10gf}	.055	.024	.028	.445±.024
Roller lever	0.35N{35gf}	0.03N{3gf}	1.4	0.6	0.7	14.9±0.6
	1.00N{102gf}	0.10N{10gf}	.055	.024	.028	.587±.024

**DIMENSIONS**

mm inch General tolerance: ±0.25 ± .010

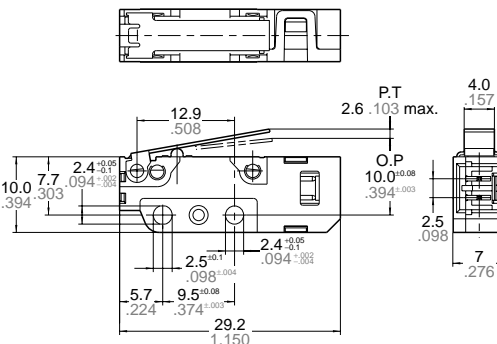
1. Pin plunger



Pretravel, Max. mm inch	0.6 .024
Movement differential, Max. mm inch	0.1 .004
Overtravel, Min. mm inch	0.4 .016
Operating position	Distance from mounting hole, mm inch
	8.4±0.3 .331±.012

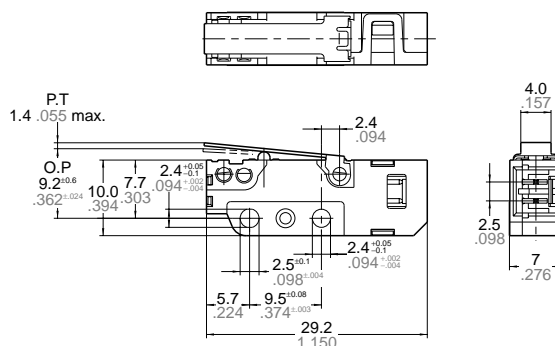
2. Hinge lever

Lever position: Standard



Pretravel, Max. mm inch	2.6 .102
Movement differential, Max. mm inch	0.8 .031
Overtravel, Min. mm inch	1.2 .047
Operating position	Distance from mounting hole, mm inch
	10.0±0.8 .394±.031

Lever position: Backward

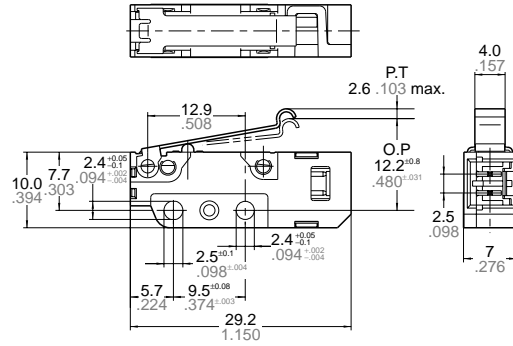
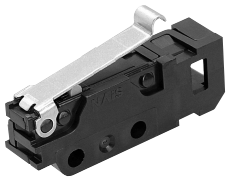


Pretravel, Max. mm inch	1.4 .055
Movement differential, Max. mm inch	0.6 .024
Overtravel, Min. mm inch	0.7 .028
Operating position	Distance from mounting hole, mm inch
	9.2±0.6 .362±.024

# AV6

## 3. Simulated roller lever

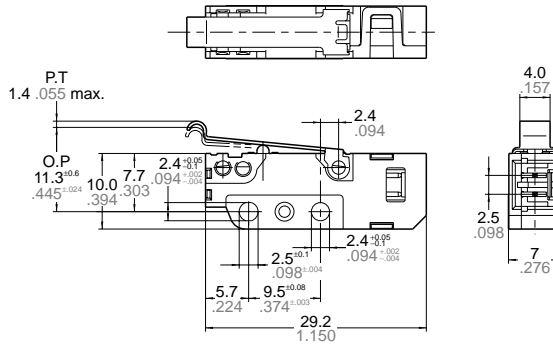
Lever position: Standard



mm inch General tolerance:  $\pm 0.25 \pm .010$

Pretravel, Max. mm inch	2.6 .102
Movement differential, Max. mm inch	0.8.031
Overtravel, Min. mm inch	1.2.047
Operating position	Distance from mounting hole, mm inch
	12.2 $\pm$ 0.8 .480 $\pm$ .031

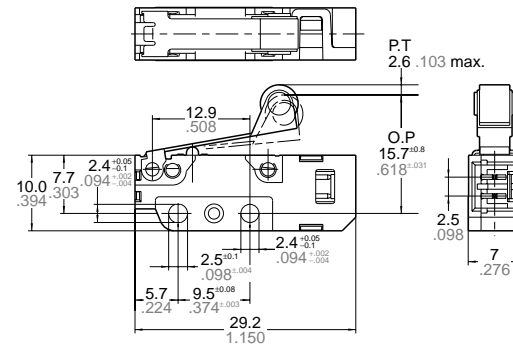
Lever position: Backward



Pretravel, Max. mm inch	1.4 .055
Movement differential, Max. mm inch	0.6.024
Overtravel, Min. mm inch	0.7.028
Operating position	Distance from mounting hole, mm inch
	11.3 $\pm$ 0.6 .445 $\pm$ .024

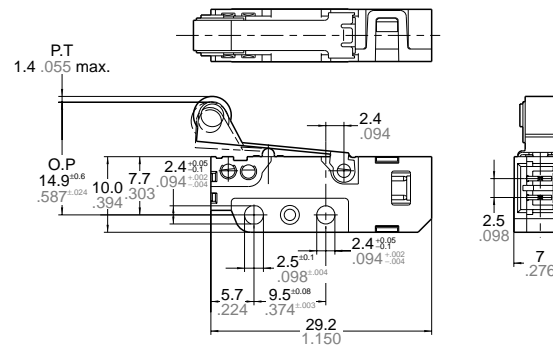
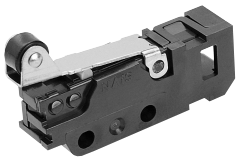
## 4. Roller lever

Lever position: Standard



Pretravel, Max. mm inch	2.6 .102
Movement differential, Max. mm inch	0.8.031
Overtravel, Min. mm inch	1.2.047
Operating position	Distance from mounting hole, mm inch
	15.7 $\pm$ 0.8 .618 $\pm$ .031

Lever position: Backward



Pretravel, Max. mm inch	1.4 .055
Movement differential, Max. mm inch	0.6.024
Overtravel, Min. mm inch	0.7.028
Operating position	Distance from mounting hole, mm inch
	14.9 $\pm$ 0.6 .587 $\pm$ .024



## NOTES

### 1. Fastening of the switch body

- 1) Use flat filister head M2.3 screws to mount switches with less than a 0.29N•m torque. Use of screws washers or adhesive lock is recommended to prevent loosening of the screws.
- 2) Check insulation distance between ground and each terminal.
- 3) When the operation object is in the free position, force should not be applied directly to the actuator or pin plunger. Also force should be applied to the pin plunger from vertical direction to the switch.
- 4) In setting the movement after operation, the over-travel should be set more than 70% as a standard.  
With the lever type, do not apply excessive force in the direction opposite to the movement, or from the horizontal direction.
- 5) For a lever type, the force from the reverse to the operation direction should not be applied.

### 2. About the connector

- 1) The connector on the CS switch is designed to fit with the XA connector produced by JST Mfg. Co., Ltd. Do not use any connector other than the specified connector, or solder the terminals directly.
- 2) Make sure leads are arranged so that no constant force is applied to them when the connectors are mated.
- 3) Keep the connector straight when inserting it. If it is inserted at an angle, it may snag near the entrance, or it may be inserted too forcefully.
- 4) Problems thought to be caused by the XA connector, which is specified as conforming to the CS switch connector, are not covered by the warranty. Please contact JST Mfg., Co., Ltd. and request cooperation in resolving the problem.

### 3. Selection of the switch

When specifying the switch, allow  $\pm 20\%$  to the listed operating characteristics.

### 4. Environment

Avoid using the switches in the following conditions;

- In corrosive gases, such as silicon gas
- In a dusty environment

When cleaning the switch, use a diluted form of a neutral cleaning agent. Using acidic or alkali solvents can adversely affect the performance of the switch.

### 5. Precautions concerning circuits

The CS switch is designed specifically for low-voltage, low-current loads. Avoid using it at loads that exceed the resistive load.

### 6. Quality check under actual loading conditions

To assure reliability, check the switch under actual loading conditions. Avoid any situation that may adversely affect switching performance.

# NAiS

**HIGH CAPACITY,  
LONG LIFE SUBMINIATURE  
SWITCH**

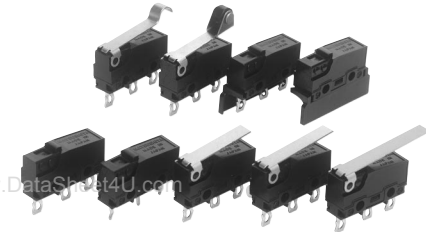
**PS (AVM3□□□P)  
SWITCHES**

## FEATURES

- 10.1 Amp. high contact capacity is available
- Long life
- H5recise operating position ( $\pm 0.25\text{mm}$ : Pin plunger type)
- Flux-resistant construction with integrally molded terminals
- In-line terminals make soldering works easy

## TYPICAL APPLICATIONS

- Heaters
- Electric carpets
- Electric rice cookers
- Copiers
- Printers
- Facsimiles
- Vending machines
- Measuring equipment
- Audio equipment



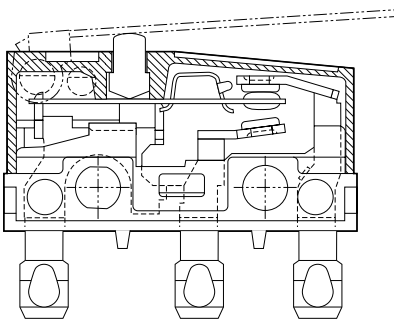
## ORDERING INFORMATION

Ex. AVM3 1 0 5 P

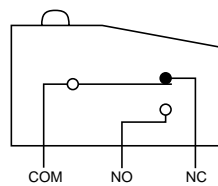
Type of switch	Terminals	Actuators	Operating force by pin plunger, max.	Capacity
PS switch	1: Self-standing solder terminal with guard 2: Self-standing solder terminal without guard 3: Self-standing solder terminal with opposite side guard 4: Self-standing PC terminal	0: Pin plunger 1: Short hinge lever 2: Hinge lever 3: Long hinge lever 4: Simulated roller lever 5: Roller lever	5: 1.47 N {150 gf}	P: High capacity (10.1 A)

Remarks: 1. When ordering UL/CSA approved types (rating:  $6 \times 10^3$ ), add suffix 9 to the part No., for example, AVM3205P9.  
 2. When ordering SEMKO approved types, add suffix 8 to the part No., for example, AVM3205P8.

## CONSTRUCTION

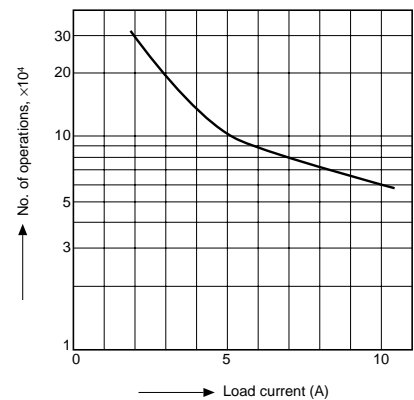


## SCHEMATIC



## DATA

Electrical life curve



## PRODUCT TYPES

Contact	Actuator	Part No.			
		Self-standing solder terminal			Self-standing PC terminal
		Without guard	With guard	With opposite side guard	
Gold-clad	Pin plunger	AVM3205P	AVM3105P	AVM3305P	AVM3405P
	Short hinge lever	AVM3215P	AVM3115P	AVM3315P	AVM3415P
	Hinge lever	AVM3225P	AVM3125P	AVM3325P	AVM3425P
	Long hinge lever	AVM3235P	AVM3135P	AVM3335P	AVM3435P
	Simulated roller lever	AVM3245P	AVM3145P	AVM3345P	AVM3445P
	Roller lever	AVM3255P	AVM3155P	AVM3355P	AVM3455P

Remarks: 1. When ordering UL/CSA approved types (rating:  $6 \times 10^3$ ), add suffix 9 to the part No., for example, AVM3205P9.  
 2. When ordering SEMKO approved types, add suffix 8 to the part No., for example, AVM3205P8.  
 3. Packing : Inner box 100 pcs, Outer box 1,000 pcs

## SPECIFICATIONS

### 1. Contact rating

Resistive load ( $\cos \phi \approx 1$ )	10.1A, 250V AC
------------------------------------------	----------------

### 2. Characteristics

Expected life	Electrical	Min. $5 \times 10^4$ (at 20 cpm) (O.T. max.)
	Mechanical	Min. $3 \times 10^7$ (O.T.: Specified value), Min. $10^7$ (O.T. max.) at 60 cpm
Dielectric strength	Between terminals	1,000 Vrms for 1 min.
	Between terminals and other exposed metal parts	2,000 Vrms for 1 min.
	Between terminals and ground	2,000 Vrms for 1 min.
Insulation resistance	Min. 100MΩ at 500V DC	
Contact resistance (initial)	Max. 50mΩ (By voltage drop, 1A 6 to 8V DC)	
Allowable operating speed (at no load)	0.1 to 1,000 mm/sec.	
Max. operating cycle rate (at no load)	300 cpm	
Ambient temperature	-25 to +85°C -13 to +155°F (Not freezing below 0°C 32°F)	
Ambient humidity	Max. 85% R.H.	
Unit weight	Approx. 2g .07oz	

### 3. Operating characteristics

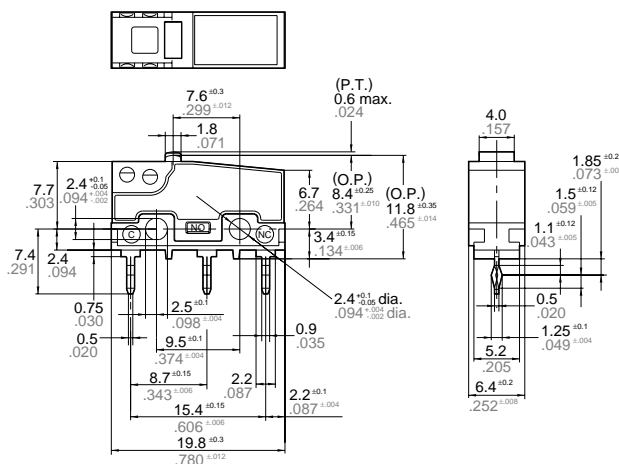
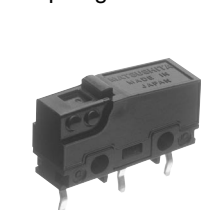
Actuator	Operating force, Max.	Release force, Min.	Pretravel, Max. mm inch	Movement differential, Max. mm inch	Overtravel, Min. mm inch	Operating position mm inch
Pin plunger	1.47 N {150 gf}	0.20 N {20 gf}	0.6 mm .024 inch	0.1 mm .004 inch	0.4 mm .016 inch	8.4±0.25 mm .331±.010 inch
Short hinge lever	0.59 N {60 gf}	0.039 N {4 gf}	2.5 mm .098 inch	0.5 mm .020 inch	0.8 mm .031 inch	8.8±0.8 mm .346±.031 inch
Hinge lever	0.54 N {55 gf}	0.034 N {3.5 gf}	2.8 mm .110 inch	0.8 mm .031 inch	1.2 mm .047 inch	8.8±0.8 mm .346±.031 inch
Long hinge lever	0.44 N {45 gf}	0.029 N {3 gf}	3.5 mm .138 inch	1.0 mm .039 inch	1.6 mm .063 inch	8.8±1.2 mm .346±.047 inch
Simulated roller lever	0.54 N {55 gf}	0.034 N {3.5 gf}	2.8 mm .110 inch	0.8 mm .031 inch	1.2 mm .047 inch	11.65±0.8 mm .459±.031 inch
Roller lever	0.59 N {60 gf}	0.039 N {4 gf}	2.5 mm .098 inch	0.5 mm .020 inch	0.8 mm .031 inch	14.5±0.8 mm .571±.031 inch

## DIMENSIONS

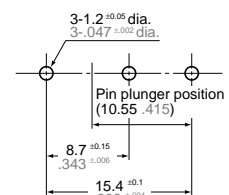
mm inch General tolerance  $\pm 0.25 \pm .010$

### 1. Self-standing PC terminal (Without guard)

Pin plunger



PC board pattern

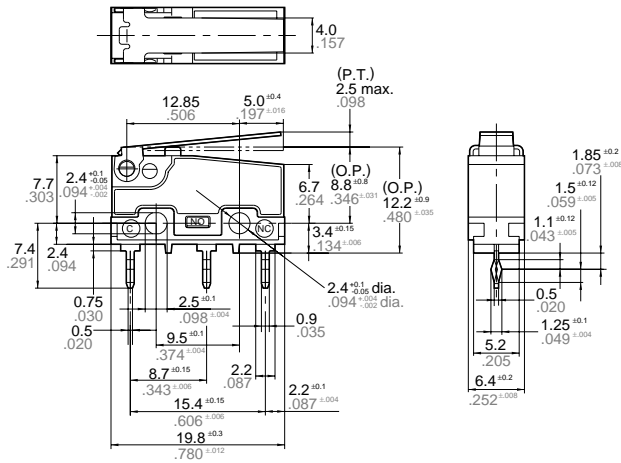


Pretravel, Max. mm inch	0.6 .024
Movement differential, Max. mm inch	0.1 .004
Overtravel, Min mm inch	0.4 .016
Operating position	Distance from mounting hole, mm inch
	8.4±0.25 .331±.010

# AVM3□□□P

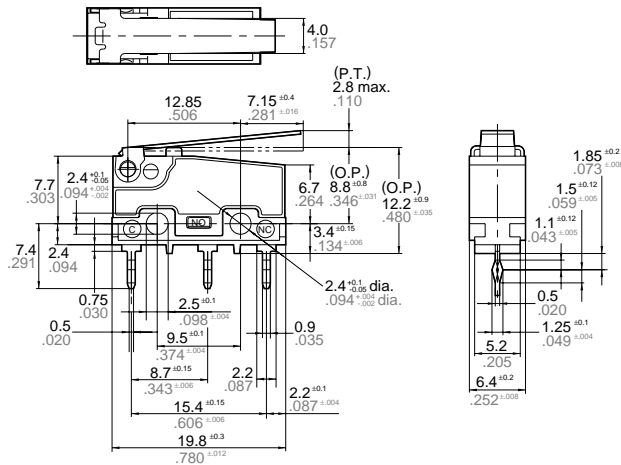
## Short hinge lever

mm inch General tolerance  $\pm 0.25$   $\pm 0.10$



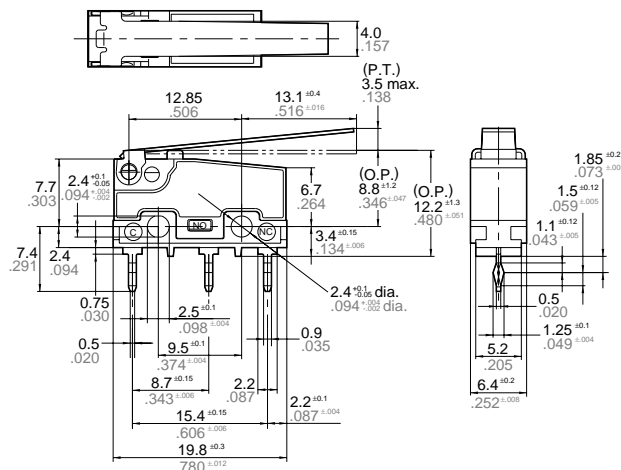
Pretravel, Max. mm inch	2.5 .098
Movement differential, Max. mm inch	0.5 .020
Overtravel, Min mm inch	0.8 .031
Operating position	Distance from mounting hole, mm inch
	8.8 $\pm$ 0.8 .346 $\pm$ 0.031

## Hinge lever



Pretravel, Max. mm inch	2.8 .110
Movement differential, Max. mm inch	0.8 .031
Overtravel, Min mm inch	1.2 .047
Operating position	Distance from mounting hole, mm inch
	8.8 $\pm$ 0.8 .346 $\pm$ 0.031

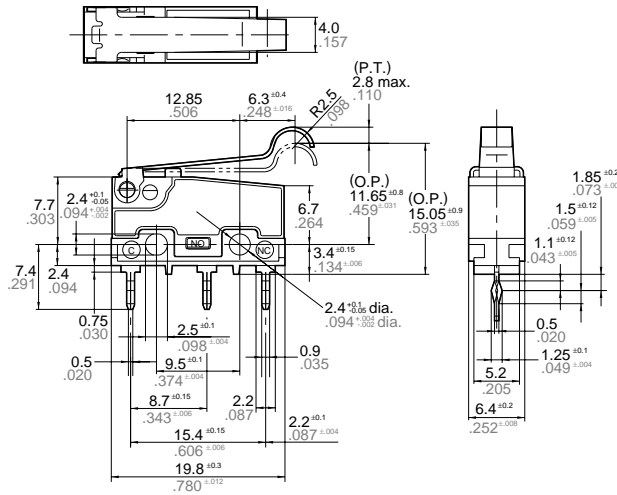
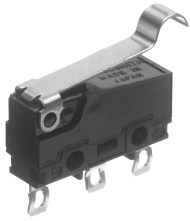
## Long hinge lever



Pretravel, Max. mm inch	3.5 .138
Movement differential, Max. mm inch	1.0 .039
Overtravel, Min mm inch	1.6 .063
Operating position	Distance from mounting hole, mm inch
	8.8 $\pm$ 1.2 .346 $\pm$ 0.047

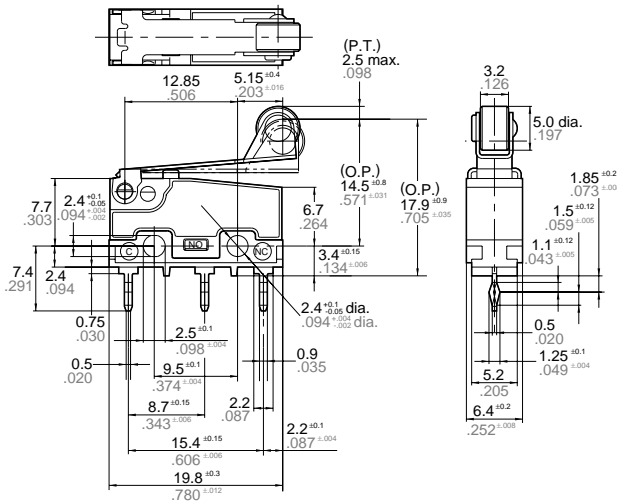
Simulated roller lever

mm inch General tolerance  $\pm 0.25 \pm 0.10$



Pretravel, Max. mm inch	2.8 .110
Movement differential, Max. mm inch	0.8 .031
Overtravel, Min mm inch	1.2 .047
Operating position	Distance from mounting hole, mm inch
	11.65 $\pm$ 0.8 .459 $\pm$ .031

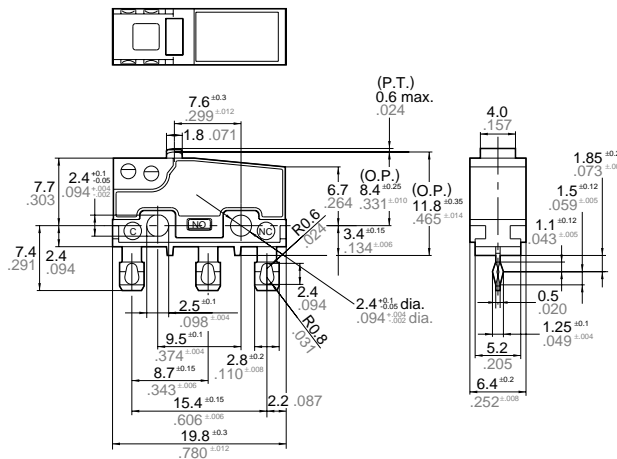
Roller lever



Pretravel, Max. mm inch	2.5 .098
Movement differential, Max. mm inch	0.5 .020
Overtravel, Min mm inch	0.8 .031
Operating position	Distance from mounting hole, mm inch
	14.5 $\pm$ 0.8 .571 $\pm$ .031

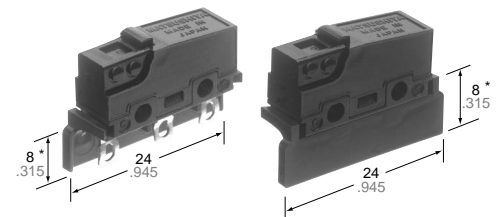
2. Self-standing solder terminal

Pin plunger



With guard

With opposite side guard



\* The height from the center of mounting hole to the edge of guard.

## NOTES

### 1. Fastening of the switch body

1) Use flat filister head M2.3 screws to mount switches with less than a 3kgf-cm torque. Use of screws washers or adhesive lock is recommended to prevent loosening of the screws.

2) Check insulation distance between ground and each terminal.

3) When the operation object is in the free position, force should not be applied directly to the actuator or pin plunger from vertical direction to the switch.

4) In setting the movement after operation, the over-travel should be set more than 70% as a standard. Setting the movement at less than 70% of O.T. may cause troubles such as miscontact and welding due to small contact force of the switch.

5) For a lever type, the force from the reverse and side to the operation direction should not be applied.

### 2. Soldering operations

For manual soldering:

Soldering should be accomplished in less than 3 seconds, with a 60 watt iron. Care should be taken not to apply force to the terminal during soldering.

For automatic soldering:

Soldering should be done less than 6 seconds in 260°C 500°F soldering bath or less than 3 seconds in 350°C 662°F soldering bath.

Terminal portions should not be moved within 1 minute after soldering.

Also no tensile strength of lead wires should be applied to the terminals.

### 3. Selection of the switch

When specifying the switch, allow  $\pm 20\%$  to the listed operating characteristics.

### 4. Environment

Avoid using the switches in the following conditions;

- In corrosive gases, such as silicon gas
- In a dusty environment

### 5. Cautions regarding use

When switching low-level circuits (6V DC 5mA, 12V DC 2mA, 24V DC 1mA), FS/FS-T Au clad contact type switches are recommended. When used to switch inductive loads (relays, solenoids, buzzers, etc.), it is recommended that a proper spark quench circuit is inserted in the switch to prevent contact faults caused by electric arcs. Care should be taken that occurrence in AC load possibly shorten the expected life.

### 6. Quality check under actual loading conditions

To assure reliability, check the switch under actual loading conditions. Avoid any situation that may adversely affect switching performance.